APPENDIX A

GEOTECHNICAL REPORTS

February 17, 2020

Bernardo|Wills Architects, PC
153 South Jefferson Street
Spokane, Washington 99201

Attention: Mr. Dell Hatch

RE: Geotechnical Evaluation
Memorial Field Turf Conversion
801 Ontario Street
Sandpoint, Idaho
ALLWEST Project No. 119-537P

Mr. Hatch,

ALLWEST has completed the authorized geotechnical evaluation for the proposed conversion of the existing grass field to synthetic turf located at 801 Ontario Street in Sandpoint, Idaho. The purpose of this evaluation was to characterize the soil and geologic conditions on the property. The attached report presents the results of the field evaluation and our recommendations to assist with design and construction of the proposed project.

We appreciate the opportunity to work with you on this project. If you have any questions or need additional information, please do not hesitate to call us at (208) 762-4721.

Sincerely,
ALLWEST

Prepared by:

Samuel Sommers, P.E.
Hayden Engineering Manager

GEOTECHNICAL EVALUATION
MEMORIAL FIELD TURF CONVERSION
801 ONTARIO STREET
SANDPOINT, IDAHO
ALLWEST PROJECT NO. 119-537P

02/17/2020

PROFESSIONAL ENGINEER
LICENSED
18465
STATE OF IDAHO
SAMUEL PROBERT SOMMERS

February 17, 2020

Prepared for:
Bernardo|Wills Architects, PC
153 South Jefferson Street
Spokane, Washington 99201

Prepared by:
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TABLE OF CONTENTS
Geotechnical Evaluation
Memorial Field Turf Conversion
801 Ontario Street
Sandpoint, Idaho

Page

EXECUTIVE SUMMARY **1**
1.0 PROJECT DESCRIPTION **1**
2.0 EVALUATION PROCEDURES **1**
3.0 SITE CONDITIONS **1**
3.1 General Geologic Conditions 1
3.2 General Soil Conditions 2
4.0 SUBSURFACE CONDITIONS **2**
4.1 Subsurface Soil Conditions 2
4.2 Groundwater Conditions 3
4.3 Existing Asphalt 3
5.0 LABORATORY TESTING **3**
6.0 CONCLUSIONS AND RECOMMENDATIONS **4**
6.1 Site Preparation 4
6.2 Excavation 5
6.3 Materials 5
6.4 Fill Placement and Compaction 6
6.5 Wet Weather Construction 6
6.6 Cold Weather Construction 6
6.7 Shallow Foundation Recommendations 7
6.8 Helical Pile Anchor Recommendations 7
6.9 Concrete Pile Foundations 8
6.10 Lateral Earth Pressures 8
6.11 Seismicity 8
6.12 Flexible (Hot Mix Asphalt) Pavement 9
6.13 Concrete Pavement and Flatworks 11
7.0 ADDITIONAL RECOMMENDED SERVICES **12**
8.0 EVALUATION LIMITATIONS **12**

Appendix A – Vicinity Map, Site and Exploration Plan
Appendix B – Boring Logs, Unified Soil Classification System
Appendix C – Laboratory Test Results

EXECUTIVE SUMMARY

ALLWEST has completed the authorized geotechnical evaluation for the Memorial Field Turf Conversion located at 801 Ontario Street in Sandpoint, Idaho. The general location of the project is shown on the Vicinity Map, Figure A-1, in Appendix A of this report. The purpose of the evaluation was to assess the subsurface conditions on the property with respect to the proposed design and construction. This report details the results of the field evaluation and laboratory testing and presents our recommendations to assist the design and construction of the proposed project. The following geotechnical considerations were identified:

- An allowable bearing pressure of 2,000 pounds per square foot (psf) can be used for shallow footings or retaining walls bearing on structural fill overlying native soil.
- Helical pile foundations should be designed by the specialty contractor and verified through load testing and full-time construction monitoring of pile installation and load testing by ALLWEST.
- The boat launch should be constructed on a minimum of 12-inches of 4+ inch angular ballast rock to provide bearing support. We recommend that the ballast extend a minimum of 5 feet off the end of the boat launch to provide protection against scour.
- The on-site soil is unsuitable for reuse as structural fill.
- The specialty event deck system should distribute vehicles loads sufficiently to protect the subgrade provided the subgrade preparation and compaction recommendations in this report are adhered to.
- For light-duty pavement: A pavement section of 2½-inches asphaltic concrete over a minimum of 6-inches crushed aggregate base over 12-inches of structural fill is recommended.
- For heavy-duty pavement: A pavement section of 3-inches asphaltic concrete over a minimum of 6-inches of crushed aggregate base over 12-inches of structural fill.

Our services were provided in general accordance with our proposal 119-537P dated December 6, 2019. Close monitoring of the construction operations discussed herein will be critical in achieving the design subgrade support. If we are not retained to provide required construction observation and materials testing services, we cannot be responsible for soil engineering related construction errors or omissions. This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled **8.0 EVALUATION LIMITATIONS** should be read for an understanding of the report limitations.

Geotechnical Evaluation
Memorial Field Turf Conversion
801 Ontario Street
Sandpoint, Idaho

1.0 PROJECT DESCRIPTION

We understand the proposed project will consist of converting the existing grass field to synthetic turf. The project will also consist of installing concrete anchors to support The Festival at Sandpoint's performance tent, expanding the parking lot, and improving other associated site features. Two field lights will be relocated and one will be added, each requiring new concrete pile foundations. **If the proposed design or loads vary from those stated, we should be notified to review our recommendations.**

2.0 EVALUATION PROCEDURES

To complete this evaluation, we reviewed soil and geologic literature for the project area. We evaluated the subsurface conditions at the site by drilling four borings throughout the project site. The approximate locations of the borings are shown on Figure A-2, Site and Exploration Plan included in Appendix A. Information obtained from the field evaluation, laboratory testing, and geotechnical analyses was utilized to develop the recommendations presented in this report.

3.0 SITE CONDITIONS

The project site is comprised of a single developed parcel with an existing baseball field approximately 7.5 acres in total size. There is an existing parking lot to the east and boat launch that extends from the parking lot to the southeast. Topographically, the property is mostly flat; however the property slopes down to the south in the southern section of the parcel towards Lake Pend Oreille, at approximately 18%. The ground coverage consists of mostly grass and dirt with sparse 2 to 6-inch diameter coniferous trees.

3.1 General Geologic Conditions

The geologic conditions on the property are mapped on the Geologic Map of the Sandpoint Quadrangle, Bonner County, Idaho, by R. Lewis et. Al., 2006. The project site is predominately mapped as glaciolacustrine deposits but transitions to lake deposits closer to the lake. The glaciolacustrine deposits are described as massive to finely laminated clay, silt, and sand deposited in ice marginal and post glacial lakes in the Purcell Trench. The lake deposits are described as soft clayey silt underlain by late glacial outwash.

3.2 General Soil Conditions

The USDA Natural Resources Conservation Service (NRCS) has mapped the soils on and around the property predominately as Mission Silt Loam. The Mission Silt Loam is described as volcanic ash and loess over silty glaciolacustrine deposits. The soil profile is described as silt, silty clay and very fine sandy loam. The permeability is slow and the run-off is slow. A seasonal high water-table is reported at a depth of 12 inches from February through May.

4.0 SUBSURFACE CONDITIONS

Four borings were drilled at the site on December 12, 2019. The borings were drilled with a trailer drill with a 4-inch hollow stem auger, representative soil samples were collected with 2-inch and 3-inch outside diameter split-spoon samplers. The approximate locations of the borings are shown on Figure A-2, Site and Exploration Plan in Appendix A. The soil conditions observed in the borings were visually described and classified in general accordance with ASTM D2487 and D2488 and the subsurface profiles were logged.

Detailed descriptions of the soil observed in the borings are presented on the Boring Logs in Appendix B of this report. The descriptive soil terms used on the boring logs and in this report can be referenced by the Unified Soil Classification System (USCS). A summary of the USCS is included in Appendix B. The subsurface conditions may vary between boring locations. Such changes in conditions would not be apparent until construction.

4.1 Subsurface Soil Conditions

The near surface geologic profile appears to consist of topsoil/undocumented fill overlying interbedded layers of clay, silt and fine sand. Descriptions of the soil types observed follow:

Topsoil – Topsoil was encountered at the ground surface in all the borings besides boring B-4. The unit consisted of sandy silt with organics and was observed as dark brown and moist. This unit is unsuitable for re-use as structural fill due to the organic content. The topsoil layer was approximately 6 inches thick.

Undocumented Fill – Undocumented fill was encountered in borings B-1 and B-3. The fill consisted of silt with gravel and concrete chunks in boring B-1, and was observed to be gray, moist and loose, extending to a depth of 5 feet. The fill encountered in B-3 consisted of silt with organics, gravel, and concrete debris. The color ranged from gray to blue to green, and the fill appeared moist to wet and medium stiff, extending to a depth of 20 feet.

Silt/clay – We encountered native silt/clay in all the borings. The unit was characterized as either silt or silty clay with varying sand content and was interbedded with the fine sand layers. In borings B-1 and B-2, the silt and silty clay located above the fine-grained sands was observed to be gray to brown, moist to wet and stiff to very stiff, with depths extending down to 15 and 20 feet. The silt located below the fine-grained sands in these borings was observed to be gray, wet, and soft to very stiff, with depths extending past the maximum depth of exploration of 31.5 feet. In boring B-4, the silt encountered was gray, wet and soft to medium stiff, with the depth extending down to 11.5 feet.

Fine-Grained Sand – This unit of native fine-grained sand was interbedded within the silt layers in boring B-1 and thinner stratifications were observed in boring B-2. The unit appeared gray, wet and loose to medium dense, with depths extending from 15 to 25 feet.

4.2 Groundwater Conditions

We encountered groundwater at approximately 12½ feet below the ground surface in borings B-1 through B-3, and within 6 inches of the ground surface in boring B-4. Changes in precipitation, irrigation, construction, or other factors may impact depth to groundwater and the surface water flow on the property and therefore, conditions may be different during construction. Seasonally it is common to encounter perched groundwater between sand and clay contacts or soil and rock contacts.

4.3 Existing Asphalt

We cored through the existing asphalt in six locations. The existing asphalt thickness ranged from 1½ to 2½ inches. We observed approximately 4 to 6 inches of base course. The existing parking lot has a significant amount of distress but is also very old. Significant distress has occurred in the areas of previous utility trenching, we recommend these areas be remediated prior to placement of new asphalt pavement.

5.0 LABORATORY TESTING

Laboratory testing was performed to supplement field classifications and to assess some of the soil engineering parameters. The laboratory testing included a particle size distribution/gradation test (ASTM D6913) and three Liquid and Plastic Limit Tests (ASTM D4318). The laboratory test results are in Appendix C of this report and presented on the boring logs in Appendix B. The laboratory testing was performed by ALLWEST.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are presented to assist the planning and design of the proposed development. The recommendations are based on our understanding of the proposed construction, the conditions observed in the explorations, and engineering analyses. **If the construction scope changes, or if conditions are encountered during construction which are different than those described in this report, we should be notified so we can review our recommendations and provide revisions, if necessary**.

6.1 Site Preparation

Clearing and Stripping: Once temporary erosion and sediment control (TESC) measures are installed, we expect site preparation to continue with clearing and grubbing brush and stripping of organic-rich topsoil. Based on our explorations, the stripping depth for topsoil removal is estimated to be approximately 6 inches. Clearing and stripping debris should be wasted off site or used for topsoil in landscape areas.

Over-Excavation: Once clearing and stripping are complete, earthwork should continue with over-excavation of the undocumented fill from underneath settlement susceptible structures and which should be replaced with structural fill. The undocumented fill contains a significant portion of silt/clay which may make it impossible to achieve the recommended compaction levels for structural fill. This material should be used in areas where settlement is not of concern.

Subgrade Preparation: Once over-excavation is complete, all areas that are at design subgrade elevation or areas that will receive new structural fill should be evaluated by the Geotechnical Engineer. The Geotechnical Engineer will determine whether additional over-excavation or subgrade stabilization is recommended.

In the event the exposed subgrade becomes unstable, yielding, or unable to be compacted due to high moisture conditions or construction traffic, we recommend that the materials be removed to a sufficient depth in order to develop stable subgrade soils that can be compacted to the minimum recommended levels. The severity of construction problems will be dependent, in part, on the precautions that are taken by the contractor to protect the subgrade soils.

Field Subgrade: Our understanding is that the Festival preparations may require driving heavy vehicles onto the field. Based on discussions we understand the vehicles will be driving on specialized event deck system to distribute the wheel loads across the field. We expect the subgrade for the field should tolerate the load once it has been distributed provided the subgrade of the field has been prepared as recommended above and the drainage layer is compacted in accordance with the recommendations in this report.

6.2 Excavation

Based on the conditions observed in our explorations, we anticipate excavation of the on-site soil can be achieved with typical excavation equipment. Temporary excavation slope stability is a function of many factors, including:

- The presence and abundance of groundwater;
- The type and density of the various soil strata;
- The depth of cut;
- Surcharge loadings adjacent to the excavation; and
- The length of time the excavation remains open.

It is exceedingly difficult under the variable circumstances to pre-establish a safe and "maintenance-free" temporary cut slope angle. Therefore, it is the responsibility of the contractor to maintain safe temporary slope configurations since the contractor is continuously at the job site, able to observe the nature and condition of the cut slopes, and able to monitor the subsurface materials and groundwater conditions encountered. Unsupported vertical slopes or cuts deeper than 4 feet are not recommended if worker access is necessary. The cuts should be adequately sloped, shored, or supported to prevent injury to personnel from local sloughing and spalling. The excavation should conform to applicable Federal, State, and Local regulations. Regarding trench wall support, the site soil is considered Type C soil according to OSHA guidelines and therefore should not exceed a 1.5H:1V temporary slope.

We recommend that all permanent cut or fill slopes constructed in native soils be designed at a 2H:1V (Horizontal:Vertical) inclination or flatter. All permanent cut and fill slopes should be adequately protected from erosion both temporarily and permanently.

6.3 Materials

The on-site native soil is considered moisture sensitive and frost susceptible based on the percent of fine grains (passing the #200 sieve). Therefore, this material is unsuitable for re-use as structural fill.

Import materials should be well-graded granular soil, free of organics, debris, and other deleterious material and meet the following recommendations. Import materials should be approved by the Geotechnical Engineer prior to delivery to the site.

Fill Type	Recommendations
Structural Fill	Maximum size ≤ 3 inches; Retained on ¾-inch sieve <30% Passing No. 200 Sieve ≤ 10%; Non-plastic
Utility Trench Backfill	Maximum size ≤ 2 inches; Passing No. 200 Sieve ≤ 15%; Non-plastic

6.4 Fill Placement and Compaction

Fill should be placed in lift thicknesses which are appropriate for the compaction equipment used. Typically, eight-inch loose lifts are appropriate for typical rubber tire and steel drum compaction equipment. Lift thicknesses should be reduced to four inches for hand operated compaction equipment. Fill should be moisture conditioned to within two percentage points of the optimum moisture content prior to placement to facilitate compaction. Structural fill and utility trench backfill should be compacted to a minimum of 95 percent of the maximum dry density established by ASTM D1557 (modified Proctor).

6.5 Wet Weather Construction

Due to the climatic effects in this region during late fall, winter, and spring (generally wet conditions), it may be necessary to over-excavate and replace wet subgrade soil which might otherwise be suitable with imported structural fill or treat with cement to provide firm subgrade support.

6.6 Cold Weather Construction

Foundations should be embedded adequately to protect against frost action as recommended in the Foundation Recommendations section of this report. We recommend removal of frost susceptible soils (soil with fines contents greater than 10 percent) within the frost-depth zone (2 feet) below concrete flatwork (sidewalks, patios, etc.) to reduce the potential detrimental effects of frost heave.

If site grading and construction are anticipated during cold weather, we recommend good winter construction practices be observed. Snow and ice should be removed from excavated and fill areas prior to additional earthwork or construction. Footings, floor slabs or structural portions of the construction should not be placed on frozen ground; nor should the supporting soils for buildings be permitted to freeze during or after construction. Frozen soils should not be used as backfill or fill.

6.7 Shallow Foundation Recommendations

The following recommendations are provided for foundations based on the subsurface conditions observed and the stated assumptions:

- Concrete anchors or retaining walls bearing on properly prepared structural fill may be designed for an allowable bearing pressure of 2,000 pounds per square foot (psf). Structural fill should extend a minimum of 36 inches below the finished exterior grades to protect against frost heave. The allowable bearing pressure value may be increased by one-third to account for transient loads such as wind and seismic.

- The boat launch should be constructed on a minimum of 12-inches of 4+ inch angular ballast rock to provide bearing support. We recommend that the ballast extend a minimum of 5 feet off the end of the boat launch to provide protection against scour.

- An ultimate value for coefficient of friction between cast-in-place concrete and gravel of 0.4 may be used for design.

- Subgrades should be free of loose soil and debris.

- Freezing and thawing should be anticipated annually within the upper 36 inches with deeper freezing occurring during years of severe weather. Consideration should be given to over-excavate underneath elements susceptible to freeze and thaw effects such as sidewalks and retaining walls. Not over-excavating and replacing with non-frost susceptible soil may reduce the performance of these elements.

- If the previous recommendations are implemented including removal of frost susceptible soils, it is our opinion the total settlement will be less than one inch and differential settlement will be less than ½-inch in 30-feet.

6.8 Helical Pile Anchor Recommendations

The tent anchors may be supported using the installation of helical piles to provide uplift resistance. These piles should be designed by the pile contractor and we should be provided an opportunity to review the design. This design is a theoretical design based on assumed values and should be verified through load testing. ALLWEST should conduct full-time observation of pile installation and load testing.

Pile installation should start with the installation of a sacrificial test pile near the center of the proposed addition. ALLWEST should be on-site for installation of the pile and record torque values. The contractor should allow a minimum of 24 hours to pass for pore pressures to dissipate from the soil and then load test the pile. The pile should be loaded to 100% of the maximum ultimate static load. ALLWEST should observe load testing and review the results. Subsurface obstructions are not expected but if encountered, may prevent pile installation to the necessary depths and may require relocating some piles. Revisions to the location of any piles after completion of the plans should be reviewed or determined by the structural engineer of record.

6.9 Lateral Earth Pressures

Below-grade walls should be designed to resist lateral earth pressures. The lateral earth pressures for imported structural fill should be calculated using the following equivalent fluid pressures:

Condition	Equivalent Fluid Pressure Structural Fill (pcf)
At-rest	55
Active	35
Passive	350

The above values are for level backfill only and do not account for hydrostatic forces. Walls should be provided with adequate drainage so hydrostatic forces do not adversely affect the walls. We recommend placement of gravel behind walls and/or weep holes to assist with drainage and reduce the potential for the buildup of hydrostatic pressures. Walls that are braced in a manner that does not allow any rotational movement (rigid) (e.g. basement walls) should be designed using the given “at-rest” equivalent fluid pressure. The active and at-rest pressures should be increased by an equivalent fluid weight of 10 pounds per cubic foot (pcf) and the passive pressure should be reduced by 10 pcf for seismic design. The dynamic component of the active pressure acts at a height of approximately 0.6 times the height of the wall.

6.10 Seismicity

We anticipate the 2015 International Building Code (IBC) will be used as the basis for design of the proposed structures. The soil at the site can be characterized as Site Class D for seismic design.

The following seismic parameters were calculated using USGS U.S. Seismic Design Maps for use with the 2015 IBC. The latitude and longitude for the site were used to specify the location of the subject property. The following Site Class D seismic parameters may be used for design.

Latitude (degrees)	Longitude (degrees)	Spectral Accelerations		Site Coefficients	
		S_s	S_1	F_a	F_v
48.2650	-116.5583	0.343g	0.113g	1.525	2.35

6.11 Flexible (Hot Mix Asphalt) Pavement

SUBGRADE

We recommend the over-excavation of 12 inches beneath pavement subgrades and replacement with structural fill. This structural fill should be proof-rolled within two days prior to commencement of actual paving operations. Areas not in compliance with the required ranges of moisture or density should be moisture conditioned and recompacted. Particular attention should be paid to high traffic areas that were rutted and disturbed earlier and to areas where backfilled trenches are located. Areas where unsuitable conditions are located should be repaired by removing and replacing the materials with properly compacted structural fills. If a significant precipitation event occurs after the evaluation or if the surface becomes disturbed, the subgrade should be reviewed by qualified personnel immediately prior to paving. The subgrade should be in its finished form at the time of the final review.

DESIGN PARAMETERS

Design Parameter	Value
Assumed: Subgrade California Bearing Ratio (CBR)	10%
Estimated: Equivalent Single Axle Load (ESAL)	75,000
Assumed: Pavement reliability	85%
Assumed: Pavement design life	20-year

PAVEMENT SECTION

MINIMUM LIGHT-DUTY PAVEMENT SECTION (CARS ONLY)	
Layer	**Thickness (inches)**
Asphalt Surface	2.5
Crushed Aggregate Base	6.0
Compacted Structural Fill Subgrade	12
Total Pavement Section	8.5

MINIMUM HEAVY-DUTY PAVEMENT SECTION	
Layer	**Thickness (inches)**
Asphalt Surface Course	3.0
Crushed Aggregate Base	6.0
Compacted Structural Fill Subgrade	12
Total Pavement Section	9.0

We also recommend a concrete apron in areas where you expect frequent truck loading, unloading, turning, starting and stopping such as around loading docks and dumpster pads.

MATERIALS

We recommend specifying crushed aggregate base meeting the requirements of the Idaho Standards for Public Works Construction (ISPWC) Section 802, Type I for crushed aggregate for base gradations. We recommend the asphalt concrete pavement meet the requirements of ITD Standard Specification 405 for plant mix asphalt concrete pavements.

We recommend the crushed aggregate base be compacted to a minimum of 95 percent of the maximum dry density established by ASTM D1557 (modified Proctor). We recommend the asphaltic concrete surface be compacted to minimum of 92 percent of the Rice density.

DRAINAGE

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the crushed aggregate base section.

We recommend drainage be included at the bottom of the crushed aggregate base layer at the storm structures to aid in removing water that may enter this layer. Drainage could consist of small diameter weep holes cored around the perimeter of the storm structures. The weep holes should be cored at the elevation of the crushed aggregate base and soil interface. The weep holes should be covered with crushed aggregate which is encompassed in Mirafi 140NL or approved equivalent which will aid in reducing fines from entering the storm system.

MAINTENANCE

The pavement sections provided in this report represent minimum recommended thicknesses. Therefore preventive maintenance should be planned and provided for through an on-going pavement management program. Preventive maintenance activities are intended to slow the rate of pavement deterioration, and to preserve the pavement investment. Preventive maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements. Prior to implementing any maintenance, additional engineering observation is recommended to determine the type and extent of preventive maintenance. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

6.12 Concrete Pavement and Flatworks

We recommend that the subgrade for concrete pavement and flatworks be prepared in accordance with the recommendations in the above flexible pavement section. Based on our understanding of the anticipated loading conditions, we recommend a minimum of 4 inches of Portland cement concrete pavement underlain by 6 inches of crushed aggregate base overlying 14 inches of structural fill. Although not required for structural support, the base course layer is recommended to help reduce potentials for slab curl, shrinkage cracking, and subgrade "pumping" through joints. Proper joint spacing will also be required to prevent excessive slab curling and shrinkage cracking. All joints should be sealed to prevent entry of foreign material and dowelled where necessary for load transfer.

Portland cement concrete should be designed with proper air-entrainment and have a minimum compressive strength of 4,000 psi after 28 days of laboratory curing for pavements. Sidewalks should have a minimum compressive strength of 3,000 psi at 28 days based on ISPWC standards. Adequate reinforcement and number of longitudinal and transverse control joints should be placed in the rigid pavement in accordance with ACI requirements. The joints should be sealed as soon as possible (in accordance with sealant manufacturer's instructions) to minimize water infiltration into the soil.

7.0 ADDITIONAL RECOMMENDED SERVICES

We recommend ALLWEST be retained to provide construction materials testing and observation to verify the soil and geologic conditions and the report recommendations are incorporated into the actual construction. The design engineer of record should determine applicable testing and special inspection requirements in accordance with the governing code documents. If we are not retained to provide required construction observation and materials testing services, we cannot be responsible for soil engineering related construction errors or omissions.

8.0 EVALUATION LIMITATIONS

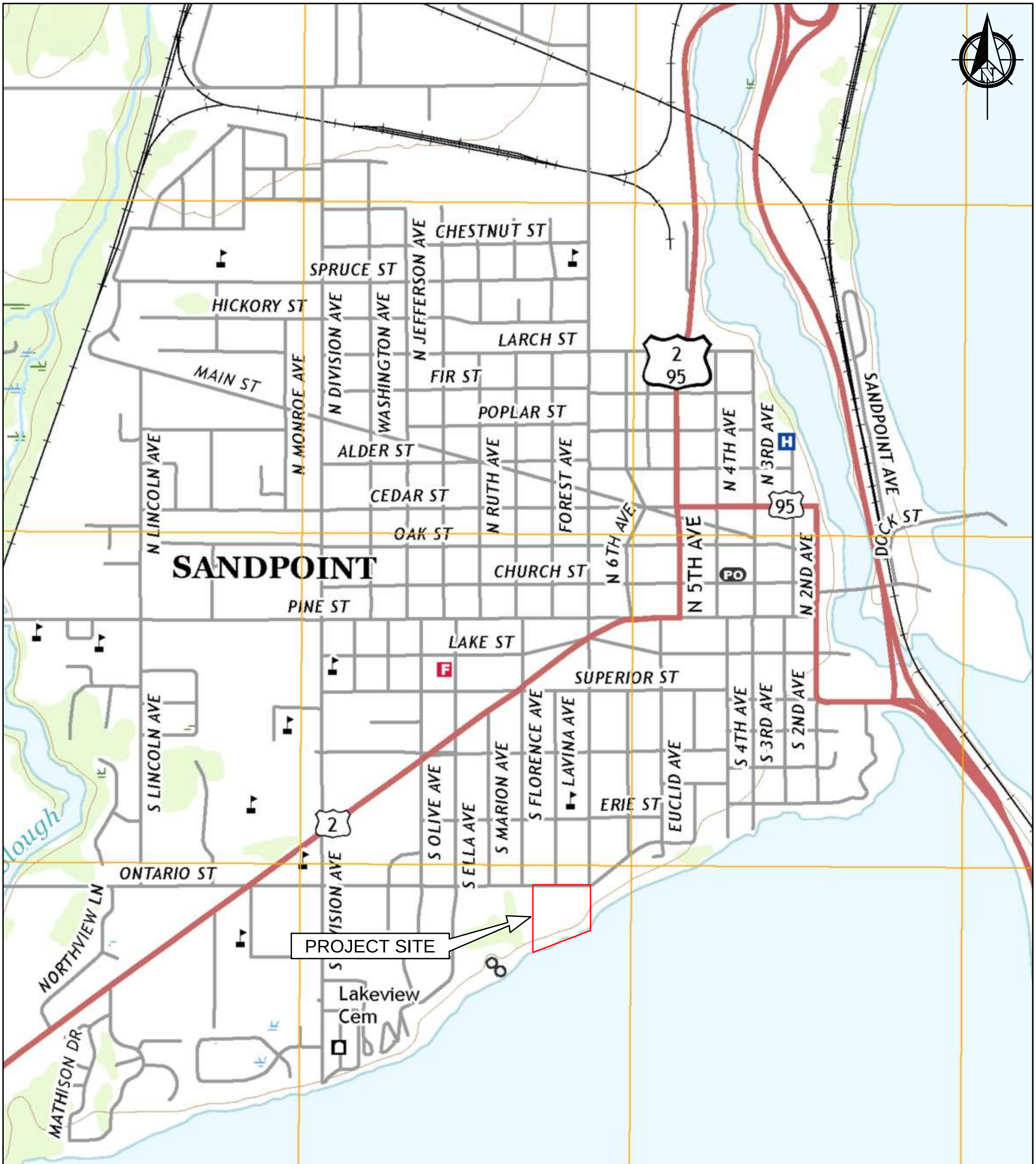
This report has been prepared to assist the planning and design for the Memorial Field Turf Conversion project located at 801 Ontario Street in Sandpoint, Idaho. Reliance by any other party is prohibited without the written authorization of ALLWEST. Our services consist of professional opinions and conclusions made in accordance with generally accepted geotechnical engineering principles and practices in the local area at the time this report was prepared. This acknowledgement is in lieu of all warranties, express or implied.

The following appendices complete this report:

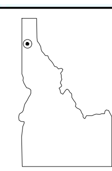
Appendix A – Vicinity Map, Site and Exploration Plan
Appendix B – Boring Logs, Unified Soil Classification System
Appendix C – Laboratory Test Results

Appendix A

Vicinity Map
Site and Exploration Plan



USGS TOPO - SANDPOINT QUADRANGLE, 2017



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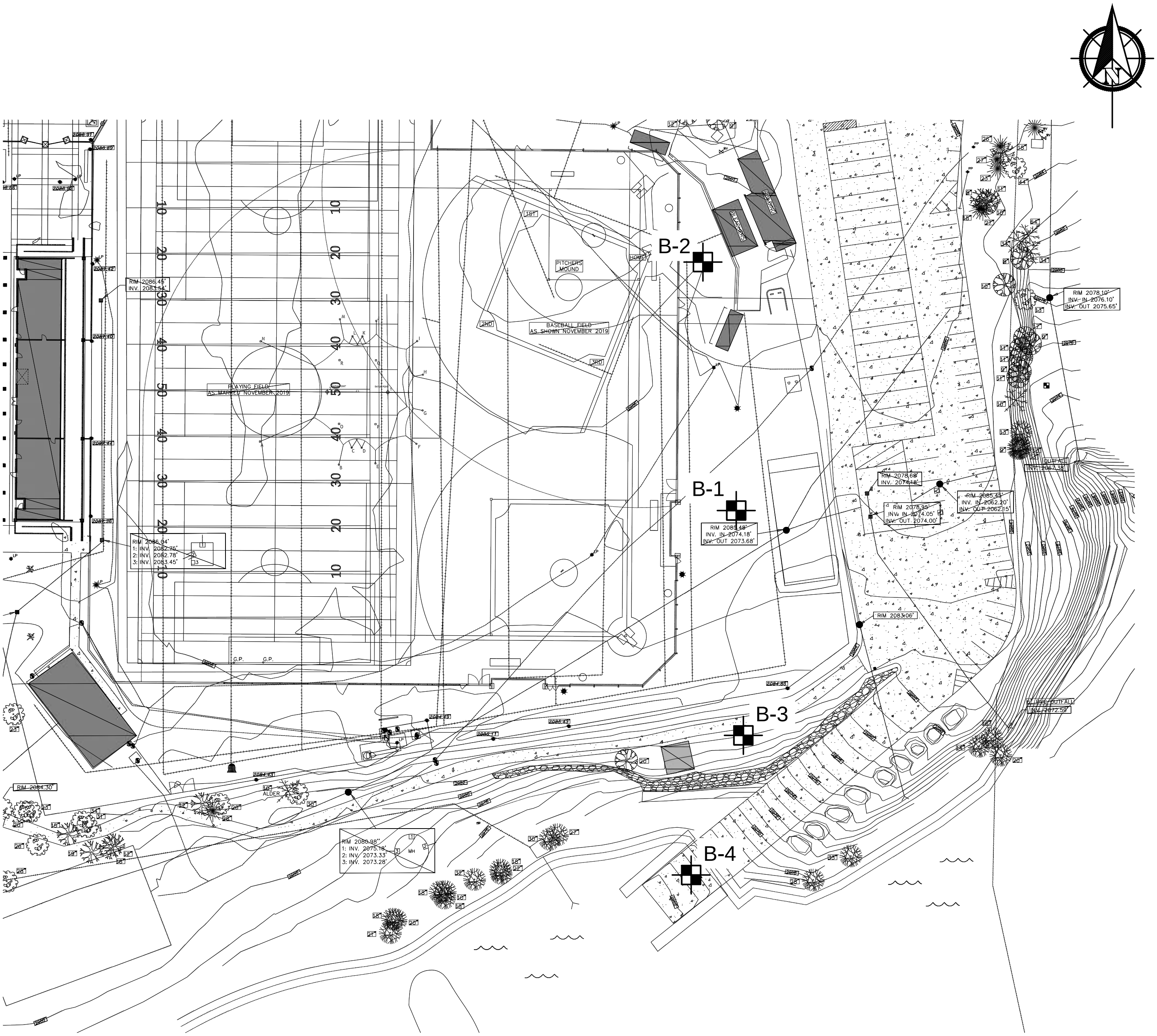
VICINITY MAP			
PROJECT:	119-537G MEMORIAL FIELD TURF CONVERSION		
LOCATION:	801 ONTARIO STREET, SANDPOINT, IDAHO		
CLIENT NAME:	BERNARDO WILLS ARCHITECTS, PC		
DATE:	DECEMBER, 2019	SCALE:	NOT TO SCALE



100 50 0 50 100

LEGEND:

B-1 BORING NUMBER AND APPROXIMATE LOCATION

BASEMAP SOURCE: TOPOGRAPHIC SURVEY PREPARED BY GLAHE & ASSOCIATES PROFESSIONAL LAND SURVEYORS, DATED DECEMBER 13, 2019.

ALLWEST

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FIGURE A-2: SITE AND EXPLORATION PLAN			
PROJECT:	119-537G MEMORIAL FIELD TURF CONVERSION		
LOCATION:	801 ONTARIO STREET, SANDPOINT, IDAHO		
CLIENT NAME:	BERNARDO WILLS ARCHITECTS		
DATE:	FEBRUARY 2020	SCALE:	AS SHOWN

Appendix B

Boring Logs
Unified Soil Classification System

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

DATE STARTED: 12/12/2019
DATE FINISHED: 12/12/2019
DRILLER: Ritch Gibson
COMPANY: Geologic Drill
LOGGER: Kenny Rukavina
WEATHER: Cloudy

BORING B-1

DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 4" Hollow Stem Auger

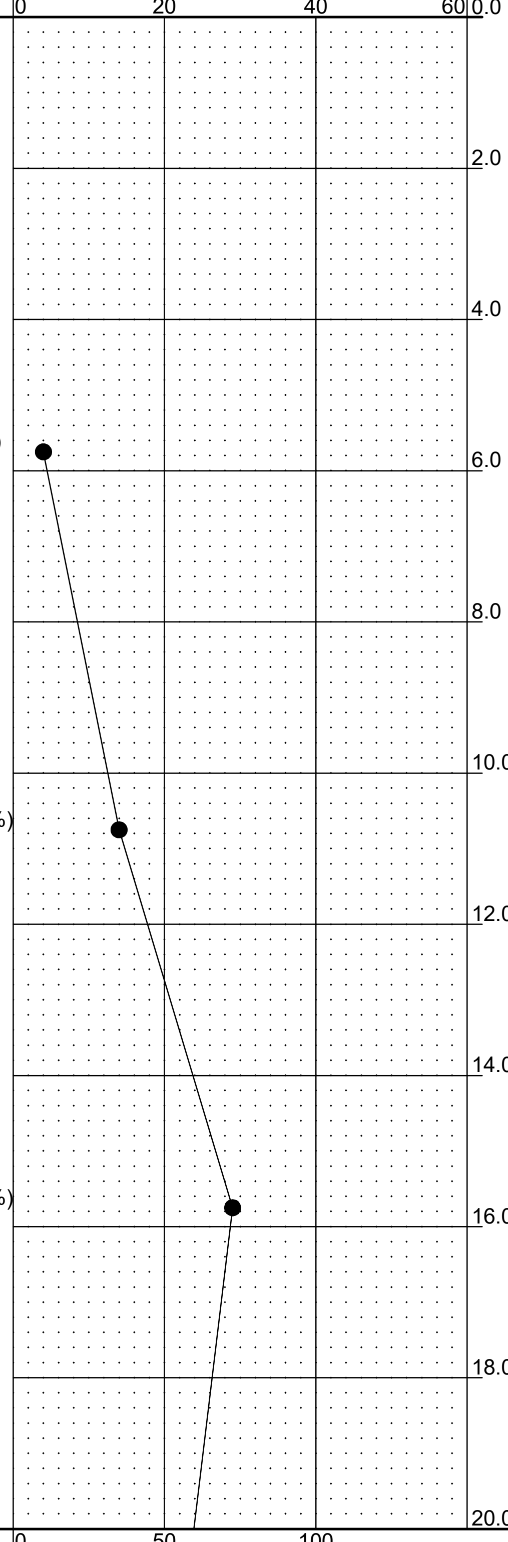
PROJECT: 119-537G Memorial Field Turf Conversion

NOTES: Refer to Figure A-2 for approximate location.

TOTAL DEPTH: 31.5'

DEPTH (ft)	DESCRIPTION	SAMPLE #	SAMPLER	FIELD BLOW COUNT (Recovery) [$(N_1)_{60}$]
0.0	Topsoil: Sandy Silt with organics, dark brown, moist.		Hollow Stem Auger	
0.5	Undocumented Fill: SILT with gravel, gray, moist, loose. Contained concrete chunks.		Hollow Stem Auger	
5	SILT with sand, gray, moist to very moist, stiff to very stiff.	S-1	2" OD Split Spoon (SPT)	4-2-2 (2" = 11%)
10	Liquid and Plastic Limits Test at 10 feet. Liquid Limit: No Value Plastic Limit: Non-Plastic Plasticity Index: Non-Plastic	S-2	2" OD Split Spoon (SPT)	3-6-8 (18" = 100%)
15	Poorly-Graded SAND with silt, gray, wet, loose to medium dense. Fine-grained.	S-3	2" OD Split Spoon (SPT)	8-11-18 (18" = 100%)

▼ WATER CONTENT (%)
PLASTIC LIMIT ⊢—⊣ LIQUID LIMIT
● FIELD "N" VALUE



RQD (%)
RECOVERY (%)

WATER LEVELS	
12.5'	▽ WHILE DRILLING
	AT COMPLETION
	AFTER DRILLING

Hollow Stem Auger
2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

DATE STARTED: 12/12/2019
DATE FINISHED: 12/12/2019
DRILLER: Ritch Gibson
COMPANY: Geologic Drill
LOGGER: Kenny Rukavina
WEATHER: Cloudy

BORING B-1

DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 4" Hollow Stem Auger

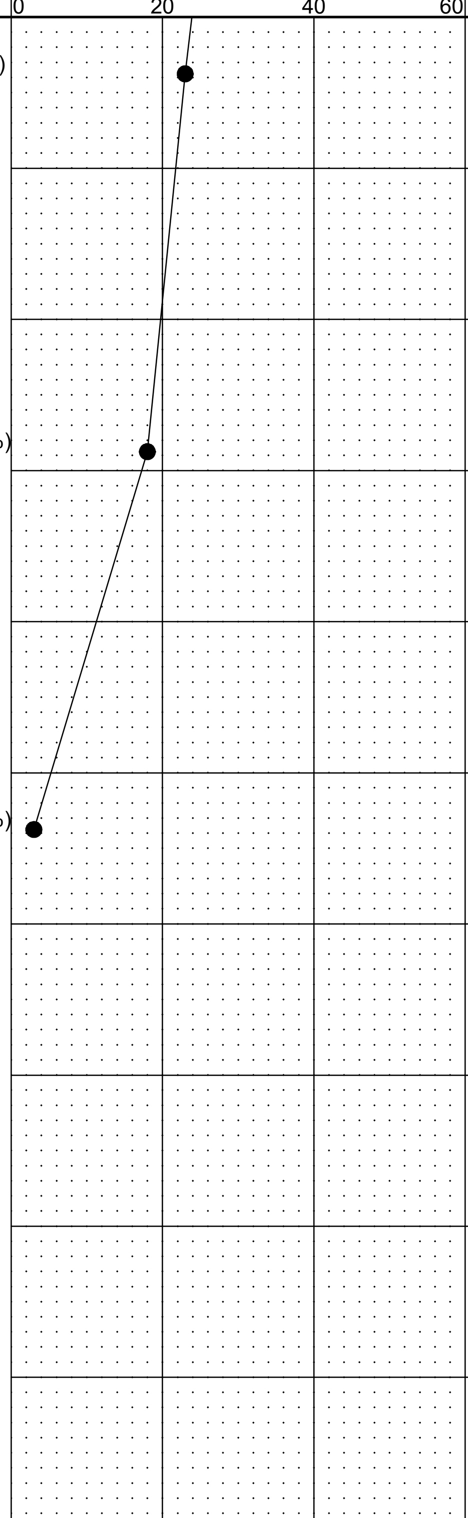
PROJECT: 119-537G Memorial Field Turf Conversion

NOTES: Refer to Figure A-2 for approximate location.

TOTAL DEPTH: 31.5'

DEPTH (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE #	SAMPLER	FIELD BLOW COUNT (Recovery) [$(N_1)_{60}$]
20	Sandy SILT, gray, wet, very stiff. Fine-grained.		S-4	2" OD Split Spoon (SPT)	7-12-11 (16" = 89%)
21–25				Hollow Stem Auger	
25	SILT, gray, wet, soft to very stiff.		S-5	2" OD Split Spoon (SPT)	1-7-10 (18" = 100%)
26.5–30				Hollow Stem Auger	
30			S-6	2" OD Split Spoon (SPT)	1-2-1 (18" = 100%)
31.5	Boring B-1 terminated at approximately 31.5 feet below ground surface. Groundwater encountered at approximately 12.5 feet.				

▼ WATER CONTENT (%)
PLASTIC LIMIT ⊢—⊣ LIQUID LIMIT
● FIELD "N" VALUE



RQD (%)
RECOVERY (%)

WATER LEVELS
12.5' ▽ WHILE DRILLING
▼ AT COMPLETION
▼ AFTER DRILLING

Hollow Stem Auger
2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

DATE STARTED: 12/12/2019
DATE FINISHED: 12/12/2019
DRILLER: Ritch Gibson
COMPANY: Geologic Drill
LOGGER: Kenny Rukavina
WEATHER: Cloudy

BORING B-2

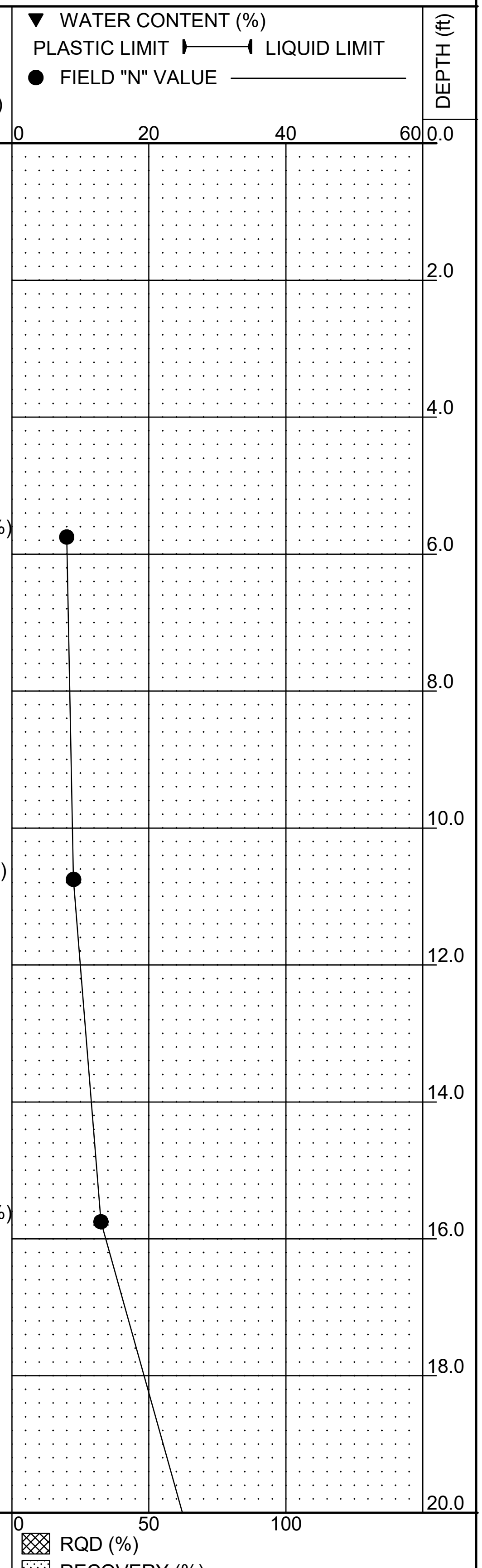
DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 4" Hollow Stem Auger

PROJECT: 119-537G Memorial Field Turf Conversion

NOTES: Refer to Figure A-2 for approximate location.

TOTAL DEPTH: 31.5'

DEPTH (ft)	DESCRIPTION	SAMPLE #	FIELD BLOW COUNT (Recovery) [$(N_1)_{60}$]
0	Topsoil: Sandy Silt with organics, dark brown, moist.		
0.5	SILT, gray, moist, stiff.		
5	Silty CLAY with sand lenses, brown, moist to very moist, stiff. Liquid and Plastic Limits Test at 5 feet. Liquid Limit: 31 Plastic Limit: 22 Plasticity Index: 9	S-1	3-4-4 (18" = 100%)
10	SILT with sand, gray-brown, wet, stiff.	S-2	1-2-7 (16" = 89%)
15	Liquid and Plastic Limits Test at 15 feet. Liquid Limit: No Value Plastic Limit: Non-Plastic Plasticity Index: Non-Plastic	S-3	1-5-8 (18" = 100%)



WATER LEVELS
12.5' WHILE DRILLING
AT COMPLETION
AFTER DRILLING

Hollow Stem Auger
2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

DATE STARTED: 12/12/2019
DATE FINISHED: 12/12/2019
DRILLER: Ritch Gibson
COMPANY: Geologic Drill
LOGGER: Kenny Rukavina
WEATHER: Cloudy

BORING B-2

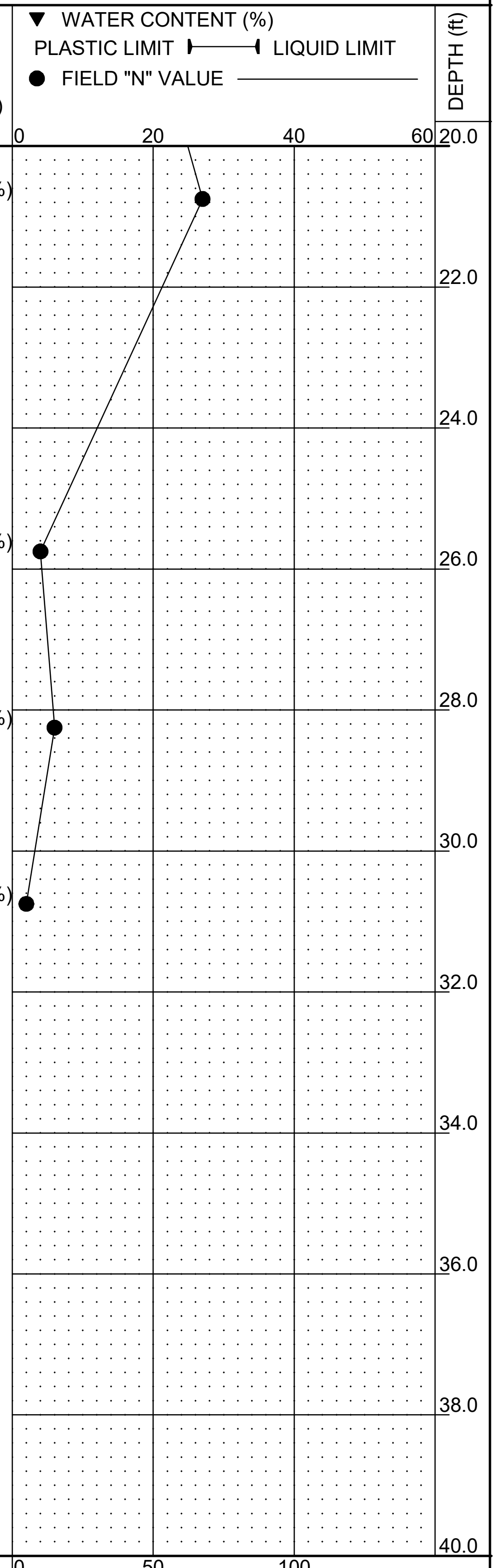
DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 4" Hollow Stem Auger

PROJECT: 119-537G Memorial Field Turf Conversion

NOTES: Refer to Figure A-2 for approximate location.

TOTAL DEPTH: 31.5'

DEPTH (ft)	DESCRIPTION	SAMPLE #	FIELD BLOW COUNT (Recovery) [$(N_1)_{60}$]
20	Sandy SILT, gray, wet, very stiff. Fine-grained. Grain-Size Distribution at 20 feet. % +3 = 0% Gravel = 0% Sand = 41% Silt / Clay = 59%	S-4	5-12-15 (18" = 100%)
25	SILT with sand lenses, gray, wet, medium stiff.	S-5	3-1-3 (18" = 100%)
27.5	SILT, gray, wet, soft to medium stiff.	S-6	4-3-3 (18" = 100%)
		S-7	0-1-1 (18" = 100%)
31.5	Boring B-2 terminated at approximately 31.5 feet below ground surface. Groundwater encountered at approximately 12.5 feet.		



RQD (%)
RECOVERY (%)

WATER LEVELS
12.5' ∇ WHILE DRILLING
AT COMPLETION
AFTER DRILLING

Hollow Stem Auger
2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

DATE STARTED: 12/12/2019
DATE FINISHED: 12/12/2019
DRILLER: Ritch Gibson
COMPANY: Geologic Drill
LOGGER: Kenny Rukavina
WEATHER: Cloudy

BORING B-3

DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 4" Hollow Stem Auger

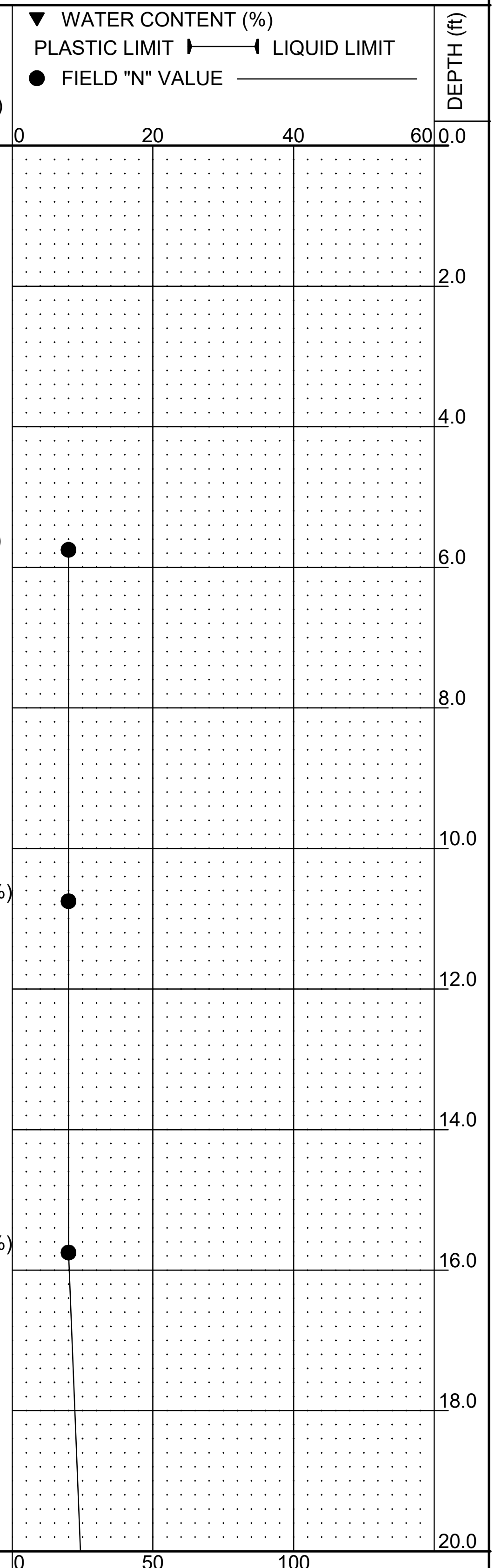
PROJECT: 119-537G Memorial Field Turf Conversion

NOTES: Refer to Figure A-2 for approximate location.

TOTAL DEPTH: 21.5'

DEPTH (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE #	SAMPLER	FIELD BLOW COUNT (Recovery) [$(N_1)_{60}$]
0	Topsoil: Sandy SILT with organics, dark brown, moist.			Hollow Stem Auger	
0.5–20	Undocumented Fill: SILT with organics and gravel, gray to blue to green, moist to wet, medium stiff. Contained concrete debris.				
5–6.5			S-1	2" OD Split Spoon (SPT)	4-4-4 (2" = 11%)
10–11.5			S-2	2" OD Split Spoon (SPT)	4-3-5 (18" = 100%)
15–16.5			S-3	2" OD Split Spoon (SPT)	4-4-4- (18" = 100%)

Depth (ft): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20



WATER LEVELS
12.5' ▽ WHILE DRILLING
▼ AT COMPLETION
▼ AFTER DRILLING

Hollow Stem Auger
2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

DATE STARTED: 12/12/2019
DATE FINISHED: 12/12/2019
DRILLER: Ritch Gibson
COMPANY: Geologic Drill
LOGGER: Kenny Rukavina
WEATHER: Cloudy

BORING B-3

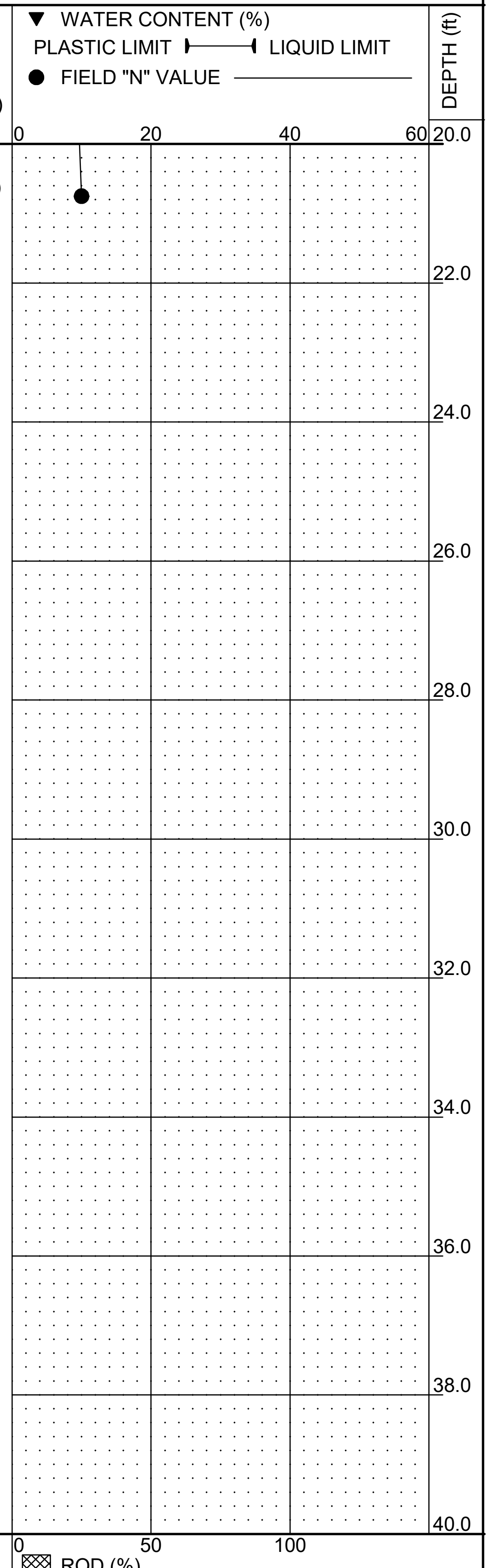
DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 4" Hollow Stem Auger

PROJECT: 119-537G Memorial Field Turf Conversion

NOTES: Refer to Figure A-2 for approximate location.

TOTAL DEPTH: 21.5'

DEPTH (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE #	SAMPLER	FIELD BLOW COUNT (Recovery) [$(N_1)_{60}$]	DEPTH (ft)
20	Sandy SILT, gray, wet, stiff.		S-4	2" OD Split Spoon (SPT)	4-6-4 (8" = 44%)	20.0
21.5	Boring B-3 terminated at approximately 21.5 feet below ground surface. Groundwater encountered at approximately 12.5 feet.					



WATER LEVELS
12.5' ▽ WHILE DRILLING
▼ AT COMPLETION
▼ AFTER DRILLING

Hollow Stem Auger
2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

DATE STARTED: 12/12/2019
DATE FINISHED: 12/12/2019
DRILLER: Ritch Gibson
COMPANY: Geologic Drill
LOGGER: Kenny Rukavina
WEATHER: Cloudy

BORING B-4

DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 4" Hollow Stem Auger

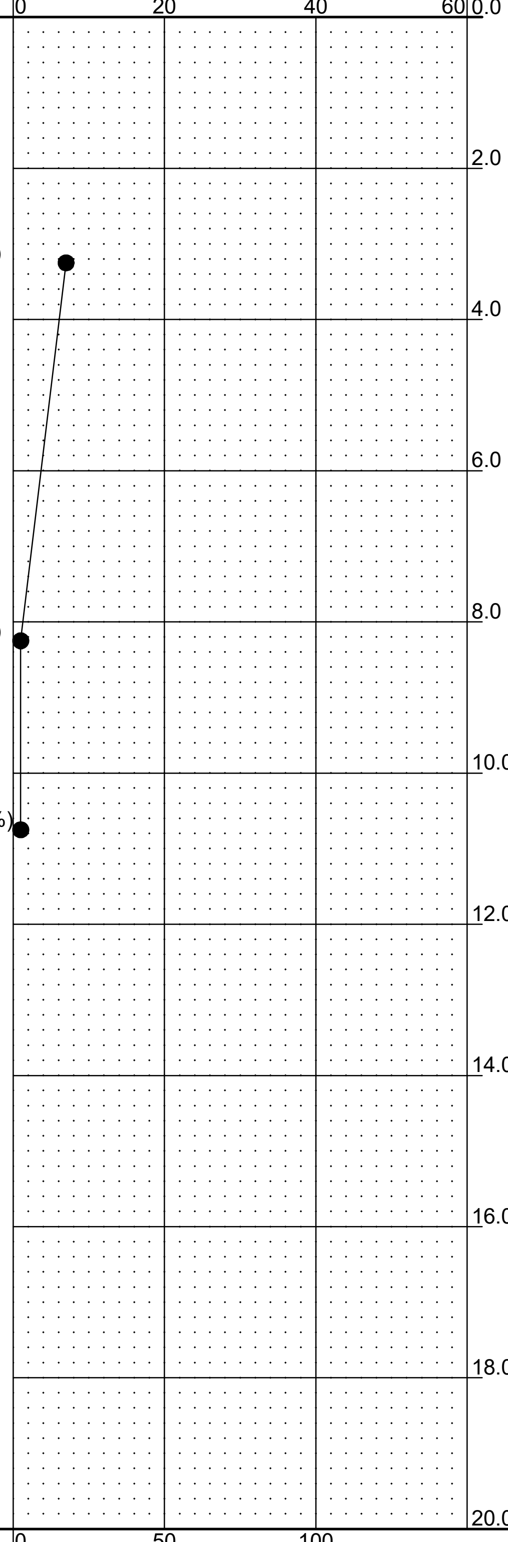
PROJECT: 119-537G Memorial Field Turf Conversion

NOTES: Refer to Figure A-2 for approximate location.

TOTAL DEPTH: 11.5'

DEPTH (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE #	SAMPLER	FIELD BLOW COUNT (Recovery) [$(N_1)_{60}$]
0	SILT with sand, gray, wet, medium stiff.			Hollow Stem Auger	
3			S-1	2" OD Split Spoon (SPT)	4-2-5 (8" = 44%)
8	grades to very soft.		S-2	2" OD Split Spoon (SPT)	0-0-1 (6" = 33%)
11			S-3	2" OD Split Spoon (SPT)	1-0-1 (18" = 100%)
11.5	Boring B-4 terminated at approximately 11.5 feet below ground surface. Groundwater encountered at surface.				

▼ WATER CONTENT (%)
PLASTIC LIMIT ├──┤ LIQUID LIMIT
● FIELD "N" VALUE



RQD (%)
RECOVERY (%)

WATER LEVELS
0.5' ▽ WHILE DRILLING
▼ AT COMPLETION
▼ AFTER DRILLING

Hollow Stem Auger
2" OD Split Spoon (SPT)

Unified Soil Classification System

MAJOR DIVISIONS			SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS	GRAVELS	CLEAN GRAVELS	GW	Well-Graded Gravel, Gravel-Sand Mixtures.
			GP	Poorly-Graded Gravel, Gravel-Sand Mixtures.
		GRAVELS WITH FINES	GM	Silty Gravel, Gravel-Sand-Silt Mixtures.
			GC	Clayey Gravel, Gravel-Sand-Clay Mixtures.
	SANDS	CLEAN SANDS	SW	Well-Graded Sand, Gravelly Sand.
			SP	Poorly-Graded Sand, Gravelly Sand.
		SANDS WITH FINES	SM	Silty Sand, Sand-Silt Mixtures.
			SC	Clayey Sand, Sand-Clay Mixtures.
FINE GRAINED SOILS	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50%		ML	Inorganic Silt, Silty or Clayey Fine Sand.
			CL	Inorganic Clay of Low to Medium Plasticity, Sandy or Silty Clay.
			OL	Organic Silt and Clay of Low Plasticity.
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH	Inorganic Silt, Elastic Silt, Micaceous Silt, Fine Sand or Silt.
			CH	Inorganic Clay of High Plasticity, Fat Clay.
			OH	Organic Clay of Medium to High Plasticity.
Highly Organic Soils			PT	Peat, Muck and Other Highly Organic Soils.

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Appendix C

Laboratory Test Results

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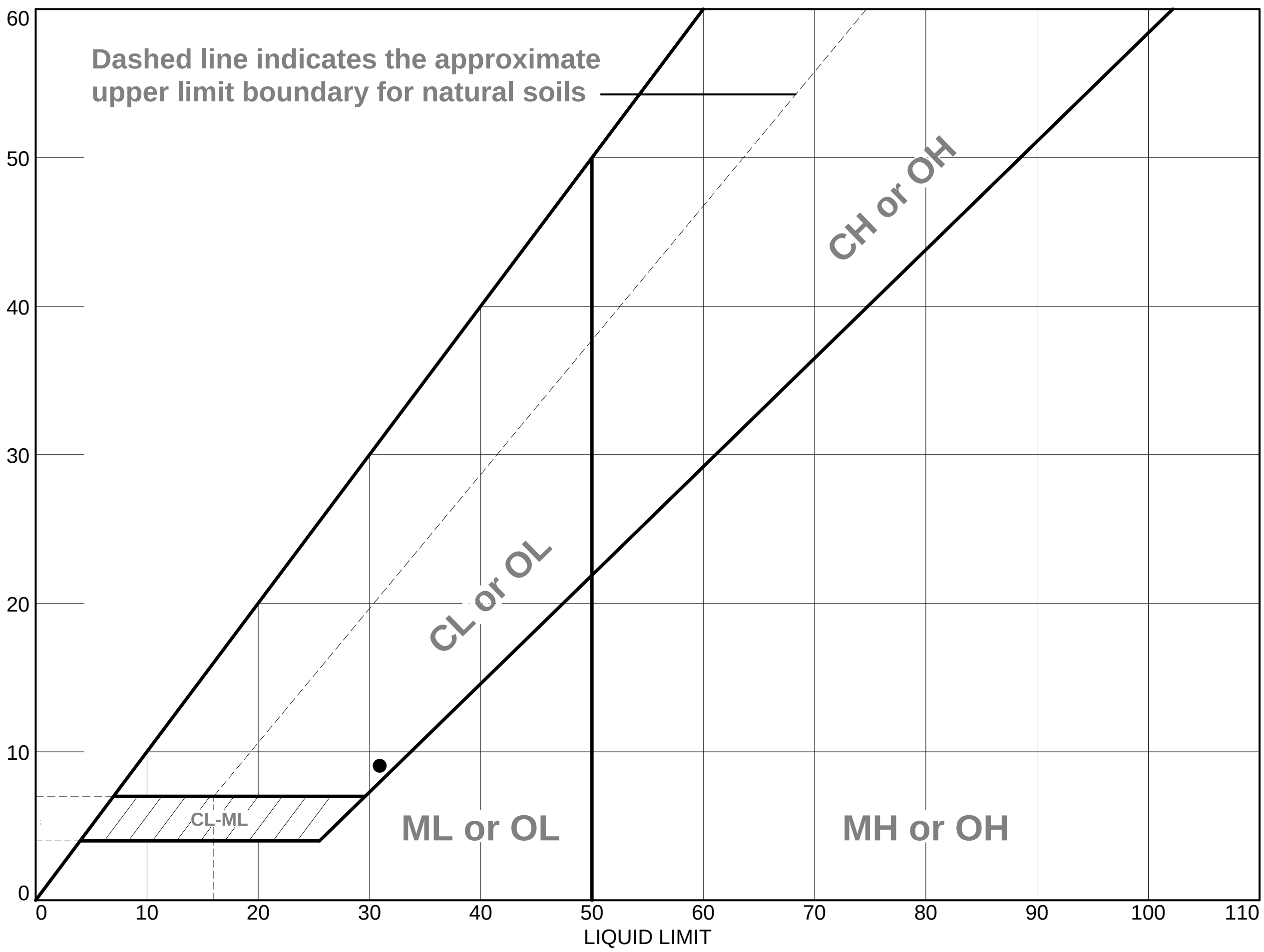
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silty Clay	31	22	9			
■	Silt	NV	NP	NP			
▲	Silt	NV	NP	NP			

Project No. 119-537G **Client:** Bernardo-Wills Architects, PS

Project: Memorial Field Turf Conversion

●**Location:** B-2 **Depth:** -5' **Sample Number:** S119-0968
■**Location:** B-1 **Depth:** -10' **Sample Number:** S119-0969
▲**Location:** B-2 **Depth:** -15' **Sample Number:** S119-0970

Remarks:
●Sampled By: K.Rukavina
Sampled Date: 12/12/19
■Sampled By: K.Rukavina
Sample Date: 12/12/19
▲Sampled By: K.Rukavina
Sample Date: 12/12/19

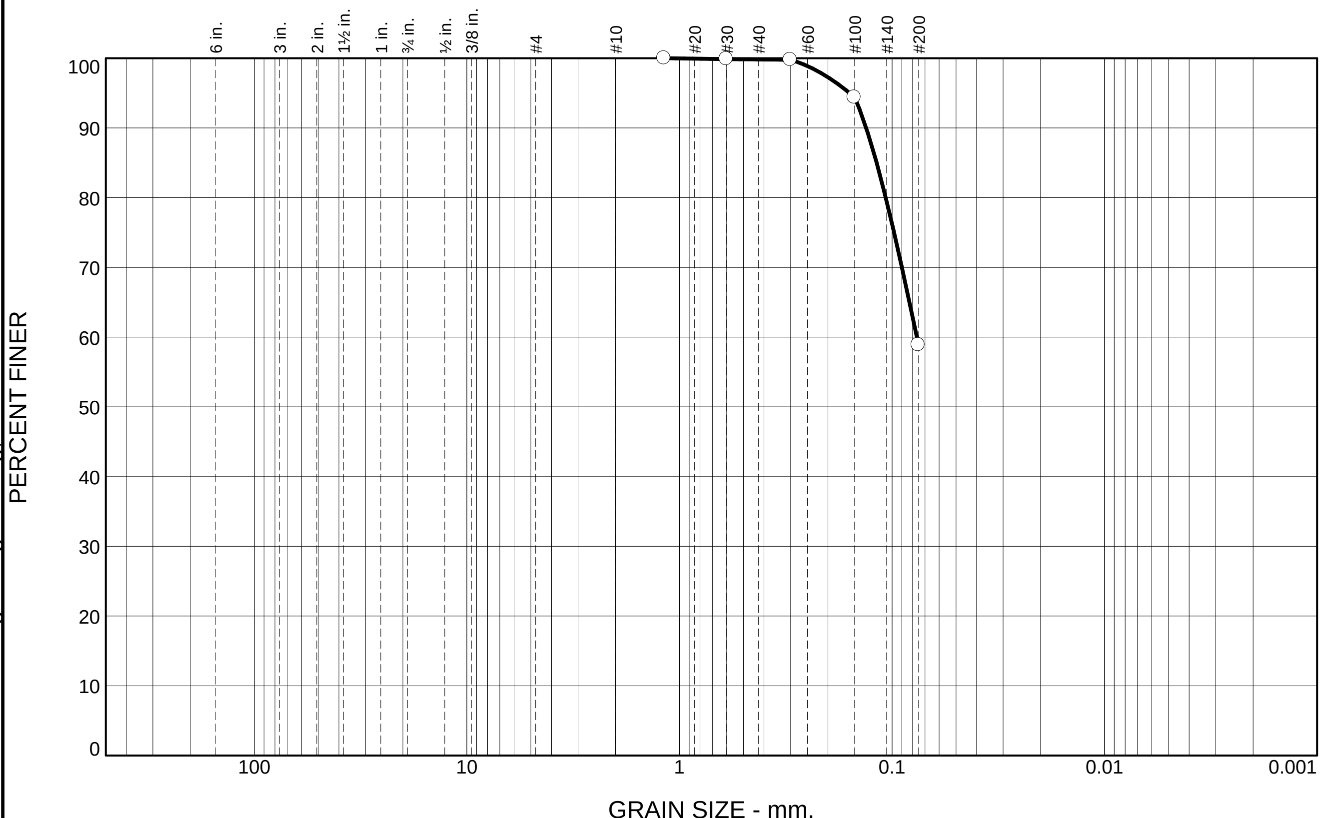
ALLWEST TESTING & ENGINEERING

Hayden, ID

Checked By:

Tested By: Noah White **Checked By:** Chris McKissen

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	41	59	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#16	100		
#30	100		
#50	100		
#100	94		
#200	59		

* (no specification provided)

Material Description

sandy silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.1322 D_{85}= 0.1181 D_{60}= 0.0764
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Sampled By: K.Rukavina
Sampled Date: 12/12/19

Location: B-2
Sample Number: S119-0971 **Depth:** -20' **Date:** 12/16/19

ALLWEST TESTING & ENGINEERING Hayden, ID

Client: Bernardo-Wills Architects, PS
Project: Memorial Field Turf Conversion
Project No: 119-537G **Checked By:**

Tested By: Noah White **Checked By:** Chris McKissen

ALLWEST Testing & Engineering

Construction Materials Testing & Special Inspection
Geotechnical Engineering
Environmental Consulting
Non-Destructive Testing
Welder Certification & Training

March 26, 2015

Mr. Scott Rivas
DCI Engineers
601 W. Riverside
Suite 600
Spokane, Washington 99201

RE: Limited Geotechnical Evaluation
Memorial Field
Sandpoint, Idaho
ALLWEST Project No.: 115-073G

Dear Mr. Rivas,

ALLWEST Testing & Engineering, LLC (ALLWEST) has completed the authorized limited geotechnical evaluation for the proposed Memorial Field improvements in Sandpoint, Idaho. The purpose of this limited evaluation was to review the subsurface soil conditions on the property and obtain soil samples for laboratory testing.

PROPOSED CONSTRUCTION

We understand the project includes improvements to the grass field which may include field turf or grading and placement of fill to improve the conditions of the field. It is reported new buildings or building additions will be constructed as a part of this scope of work.

SITE CONDITIONS

To complete this limited evaluation, we performed six (6) borings with a four (4) inch diameter hand auger. The soil conditions encountered in the borings were visually described and classified in general accordance with ASTM D2487 and D2488 and the subsurface profiles were logged. The borings were loosely backfilled at the conclusion of the field evaluation.

SUBSURFACE CONDITIONS

The soils observed in the borings generally consisted of topsoil underlain by fill and native silt, lean clay and silt with sand. Detailed descriptions follow:

Topsoil – Topsoil was encountered at the surface in each of the borings to a depth of approximately ½ foot below ground surface. The topsoil contained silt described as soft, dark brown and moist with roots and organics observed throughout.

Fill – Fill consisting of sandy silt, well-graded sand with silt and gravel. The fill was described as soft to firm and lightly compacted, tan to dark brown and moist.

Lean Clay – The lean clay was described as soft to firm, gray to tan and moist to wet.

Silt – The silt was described as soft, gray and moist.

Silt with sand – The silt with sand was soft to firm, tan and moist.

Groundwater was observed in borings HA-1, HA-2 and HA-3 at depths ranging from 3½ to 4½ feet below ground surface. Groundwater was not observed in borings HA-4, HA-5 and HA-6.

LABORATORY TESTING

Laboratory testing was performed to supplement field classifications and to assesss some of the soil engineering parameters. The laboratory testing included sieve analysis/gradations (ASTM C136), Atterberg limits (ASTM D4318) and moisture content (ASTM C586). The laboratory test results are attached to this report. The laboratory testing was performed by ALLWEST.

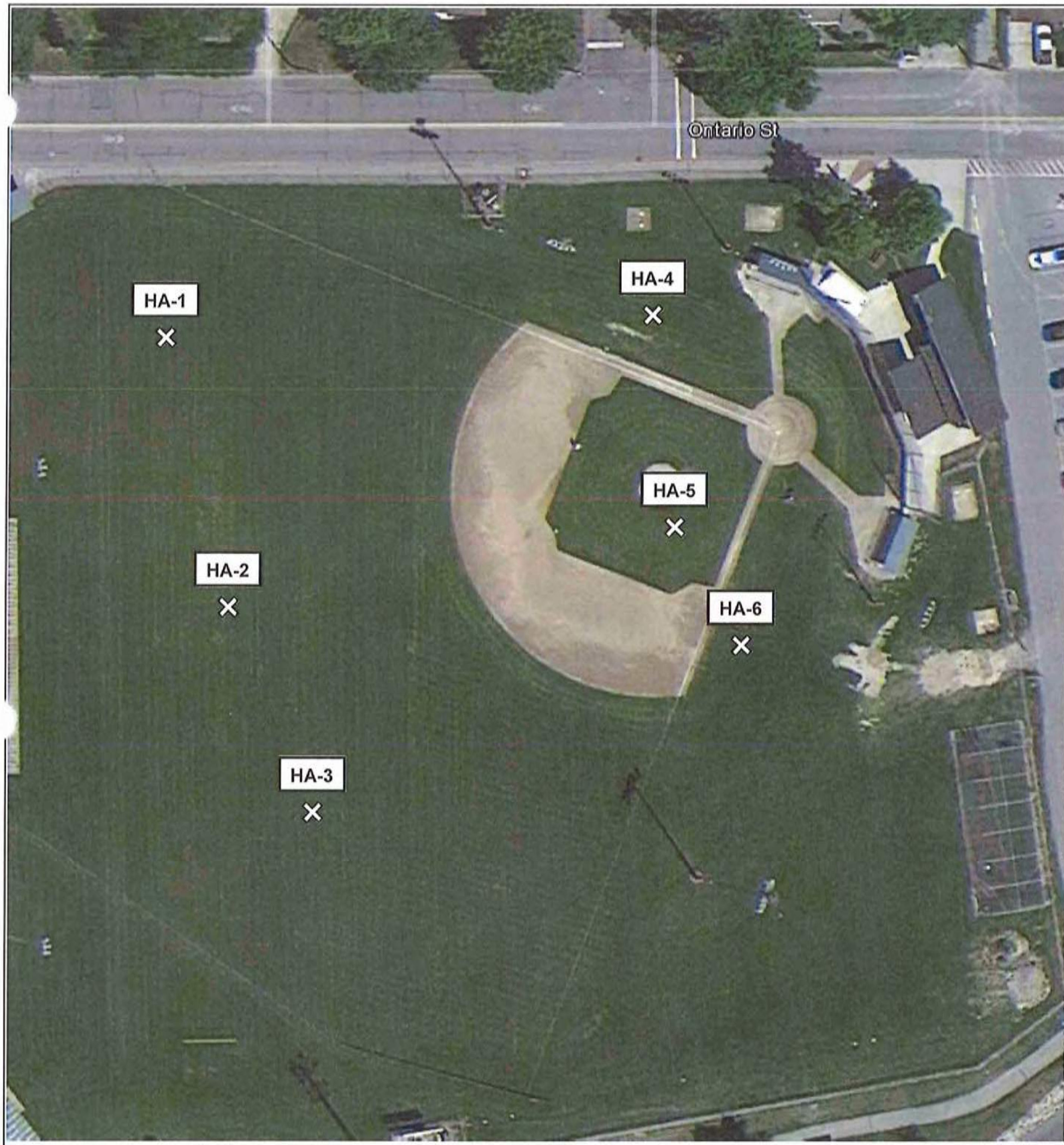
This report has been prepared to assist the planning and design of the proposed Memorial Field improvements in Sandpoint, Idaho. Reliance by any other party is prohibited without the written authorization of ALLWEST. Our services consist of professional opinions and conclusions made in accordance with generally accepted geotechnical engineering principles and practices. This acknowledgement is in lieu of all warranties either expressed or implied.

We appreciate the opportunity to work with you on this project. If you have any questions or need additional information, please do not hesitate to call us at (208) 762-4721.

Sincerely,
ALLWEST Testing & Engineering, LLC

Colin Meehan, P.E.
Hayden Area Manager

Attachment: Hand Auger Boring Location Map
Hand Auger Boring Logs
Laboratory Test Results



REFERENCE: USGS

BORING LOCATIONS ARE APPROXIMATE

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

N W E S	ALLWEST Testing & Engineering	**HAND AUGER BORING LOCATION MAP**
		Memorial Field
		Ontario Street
		Sandpoint, Idaho
	Hayden, Idaho	Client Name: DCI Engineers
	www.allwesttesting.com	Project No.: 115-073G
		Date:: March 26, 2015

ALLWEST TESTING & ENGINEERING, LLC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 3/19/2015
DATE FINISHED: 3/19/2015
OPERATOR: Sean Brady
COMPANY: ALLWEST
ENGINEER: S. Brady
WEATHER: Sunny

TEST PIT HA-1

EXCAVATOR: Hand Auger
EXCAVATION METHOD: Hand Auger Excavation

PROJECT: 115-073G Memorial Field
NOTES:

STATION, OFFSET:

TOTAL DEPTH: 5.5'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES	DEPTH (ft)
0.0	TOPSOIL	TOPSOIL; SILT, appeared soft, dark brown, moist. Surface organics and roots observed throughout.				0.0
0.5	FILL	FILL; Sandy SILT, appeared soft, dark brown, moist.				0.5
1.0	FILL	FILL; Well-graded SAND with silt and gravel, coarse-grained, appeared loose, tan, moist.				1.0
1.5	ML	SILT with sand; appeared soft to firm, tan, moist.			Bulk sample obtained. Bulk sample obtained.	1.5
5.0	CL	Lean CLAY; appeared firm, tan, wet.			Bulk sample obtained.	5.0
5.5		Bottom of hand auger excavation HA-1 at approximately 5 1/2 feet below ground surface. Groundwater encountered at approximately 4 feet below ground surface.			Bulk sample obtained.	5.5

WATER LEVELS
4' ∇ WHILE EXCAVATING
▼ AT COMPLETION
▼ AFTER EXCAVATING

Sheet 1 of 1

ALLWEST TESTING & ENGINEERING, LLC. HAYDEN, IDAHO GEOTECHNICAL SECTION TEST PIT LOG	DATE STARTED: 3/19/2015 DATE FINISHED: 3/19/2015 OPERATOR: Sean Brady COMPANY: ALLWEST ENGINEER: S. Brady WEATHER: Sunny	TEST PIT HA-2 EXCAVATOR: Hand Auger EXCAVATION METHOD: Hand Auger Excavation
PROJECT: 115-073G Memorial Field STATION, OFFSET:	NOTES:	

TOTAL DEPTH: 5'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES	DEPTH (ft)
0.0	TOPSOIL	TOPSOIL; SILT, appeared soft, dark brown, moist. Surface organics and roots observed throughout.				0.0
0.5	FILL	FILL; Sandy SILT, appeared soft, dark brown, moist.				0.5
0.8	FILL	FILL; Well-graded SAND with silt and gravel, coarse-grained, appeared loose, tan, moist.			Bulk sample obtained.	0.8
1.5	FILL	FILL; Sandy SILT, appeared soft, dark brown, moist.			Bulk sample obtained.	1.5
2.5	ML	SILT with sand; appeared soft to firm, tan, moist.				2.5
▽						▽
4.0	CL	Lean CLAY; appeared firm, tan, moist.				4.0
5.0		Bottom of hand auger excavation HA-2 at approximately 5 feet below ground surface. Groundwater encountered at approximately 3 1/2 feet below ground surface.				5.0

WATER LEVELS
3.5' ▽ WHILE EXCAVATING
▽ AT COMPLETION
▼ AFTER EXCAVATING

Sheet 1 of 1

ALLWEST TESTING & ENGINEERING, LLC. HAYDEN, IDAHO GEOTECHNICAL SECTION TEST PIT LOG	DATE STARTED: 3/19/2015 DATE FINISHED: 3/19/2015 OPERATOR: Sean Brady COMPANY: ALLWEST ENGINEER: S. Brady WEATHER: Sunny	TEST PIT HA-3 EXCAVATOR: Hand Auger EXCAVATION METHOD: Hand Auger Excavation
PROJECT: 115-073G Memorial Field STATION, OFFSET:	NOTES:	

DEPTH (ft)	USCS	TOTAL DEPTH: 5' DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES	DEPTH (ft)
0.0	TOPSOIL	TOPSOIL; SILT, appeared soft, dark brown, moist. Surface organics and roots observed throughout.				0.0
0.5	FILL	FILL; Sandy SILT, appeared soft, dark brown, moist.				0.5
1.5	CL	Lean CLAY; appeared firm, tan, moist.				1.5
∇						∇
5.0		Bottom of hand auger excavation HA-3 at approximately 5 feet below ground surface. Groundwater encountered at approximately 4 feet below ground surface.			Bulk sample obtained.	5.0

WATER LEVELS
4' ∇ WHILE EXCAVATING
▼ AT COMPLETION
▼ AFTER EXCAVATING

ALLWEST TESTING & ENGINEERING, LLC. HAYDEN, IDAHO GEOTECHNICAL SECTION TEST PIT LOG	DATE STARTED: 3/19/2015 DATE FINISHED: 3/19/2015 OPERATOR: Sean Brady COMPANY: ALLWEST ENGINEER: S. Brady WEATHER: Sunny	TEST PIT HA-4 EXCAVATOR: Hand Auger EXCAVATION METHOD: Hand Auger Excavation
PROJECT: 115-073G Memorial Field STATION, OFFSET:	NOTES:	

TOTAL DEPTH: 5'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES	DEPTH (ft)
0.0	TOPSOIL	TOPSOIL; SILT, appeared soft, dark brown, moist. Surface organics and roots observed throughout.				0.0
0.5	FILL	FILL; Sandy SILT, appeared soft, dark brown, moist.				0.5
1.0	FILL	FILL; SILT with gravel, appeared soft to firm, brown, moist.				1.0
3.0	CL	Lean CLAY; appeared firm, tan, moist.			Bulk sample obtained.	3.0
4.0	ML	SILT with sand; fine-grained, appeared soft, gray, wet.				4.0
5.0		Bottom of hand auger excavation HA-4 at approximately 5 feet below ground surface. No groundwater encountered.				5.0

WATER LEVELS
▽ WHILE EXCAVATING
▼ AT COMPLETION
▼ AFTER EXCAVATING

Sheet 1 of 1

ALLWEST TESTING & ENGINEERING, LLC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 3/19/2015
DATE FINISHED: 3/19/2015
OPERATOR: Sean Brady
COMPANY: ALLWEST
ENGINEER: S. Brady
WEATHER: Sunny

TEST PIT HA-5

EXCAVATOR: Hand Auger
EXCAVATION METHOD: Hand Auger Excavation

PROJECT: 115-073G Memorial Field
NOTES:

STATION, OFFSET:

TOTAL DEPTH: 5'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES	DEPTH (ft)
0.0	TOPSOIL	TOPSOIL; SILT, appeared soft, dark brown, moist. Surface organics and roots observed throughout.				0.0
0.5	FILL	FILL; Sandy SILT, appeared soft, dark brown, moist.				0.5
1.0	FILL	FILL; SILT with gravel, appeared soft to firm, brown, moist.			Bulk sample obtained.	1.0
3.0	CL	Lean CLAY; appeared soft to firm, tan, moist.				3.0
5.0		Bottom of hand auger excavation HA-5 at approximately 5 feet below ground surface. No groundwater encountered.			Bulk sample obtained.	5.0

WATER LEVELS
▽ WHILE EXCAVATING
▼ AT COMPLETION
▼ AFTER EXCAVATING

Sheet 1 of 1

ALLWEST TESTING & ENGINEERING, LLC. HAYDEN, IDAHO GEOTECHNICAL SECTION TEST PIT LOG	DATE STARTED: 3/19/2015 DATE FINISHED: 3/19/2015 OPERATOR: Sean Brady COMPANY: ALLWEST ENGINEER: S. Brady WEATHER: Sunny	TEST PIT HA-6 EXCAVATOR: Hand Auger EXCAVATION METHOD: Hand Auger Excavation
PROJECT: 115-073G Memorial Field STATION, OFFSET:	NOTES:	

TOTAL DEPTH: 5'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES	DEPTH (ft)
0.0	TOPSOIL	TOPSOIL; SILT, appeared soft, dark brown, moist. Surface organics and roots observed throughout.				0.0
0.5	FILL	FILL; SILT with gravel, appeared soft to firm, brown, moist.				0.5
1.5	CL	Lean CLAY; appeared firm, tan, moist. Wet.			Bulk sample obtained.	1.5
4.0	SP	SILT; fine-grained, appeared soft, gray, moist.			Bulk sample obtained.	4.0
5.0		Bottom of hand auger excavation HA-6 at approximately 5 feet below ground surface. No groundwater encountered.			Bulk sample obtained.	5.0

WATER LEVELS
- ▽ WHILE EXCAVATING
- ▼ AT COMPLETION
- ▼ AFTER EXCAVATING

Summary of Laboratory Test Results

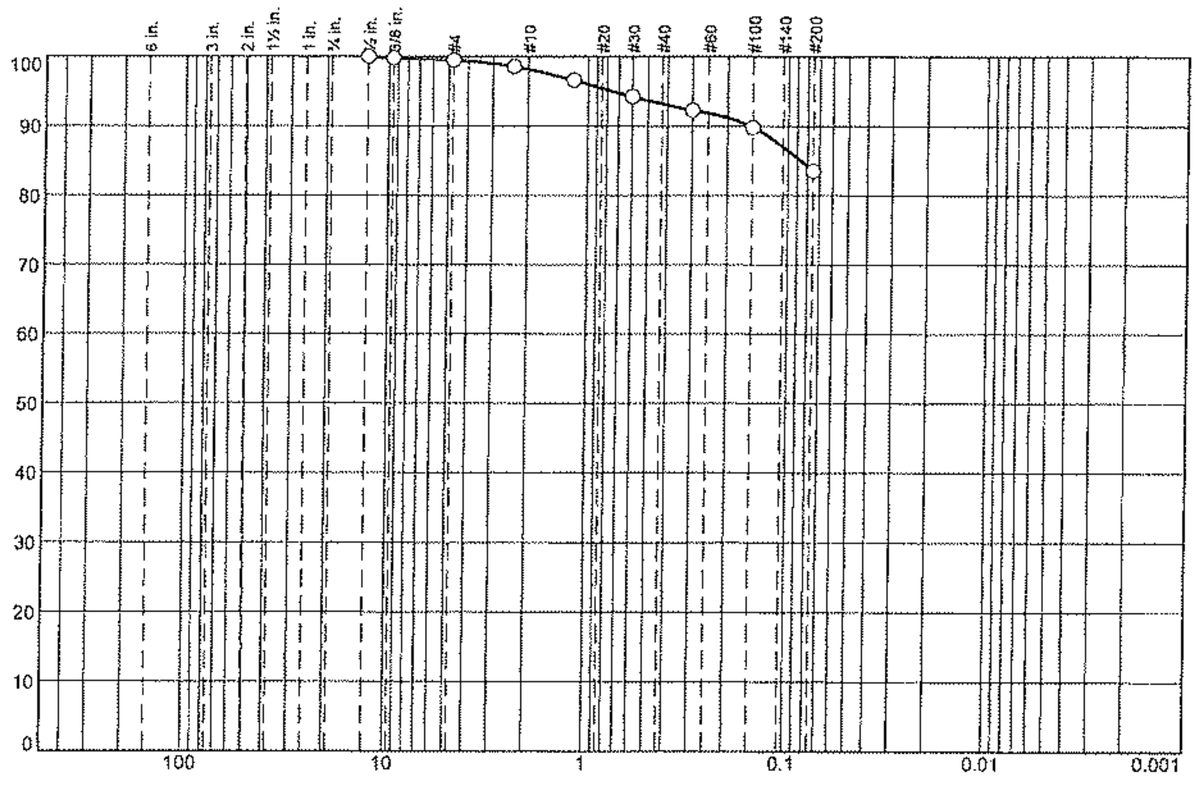
Boring No.	Depth (feet)	Moisture Content (%)	Liquid Limit	Plasticity Index	Gravel (%)	Sand (%)	Silt / Clay (%)	USCS Classification
HA-1	2	28.6	NV	NP	0	16	83.5	Silt with sand (ML)
HA-2	1	5.5	NV	NP	19	76	5.2	Well-graded sand with silt and gravel (SW-SM)
HA-3	3	23.2	34	13	0	10	90	Lean clay (CL)
HA-6	5	27.5	NV	NP	0	2	97	Silt (ML)

ALLWEST Testing & Engineering

Summary of Laboratory Test Results
Memorial Field
Sandpoint, Idaho

ALLWEST Project No. 115-073G

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	2	5	9	84	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100		
3/8"	100		
#4	100		
#8	99		
#16	97		
#30	94		
#50	92		
#100	90		
#200	84		

* (no specification provided)

Material Description

silt with sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.1543 D_{85}= 0.0864 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Sampled By: S. Brady
Sample Date: 3/19/15
Moisture Content: 28.6%

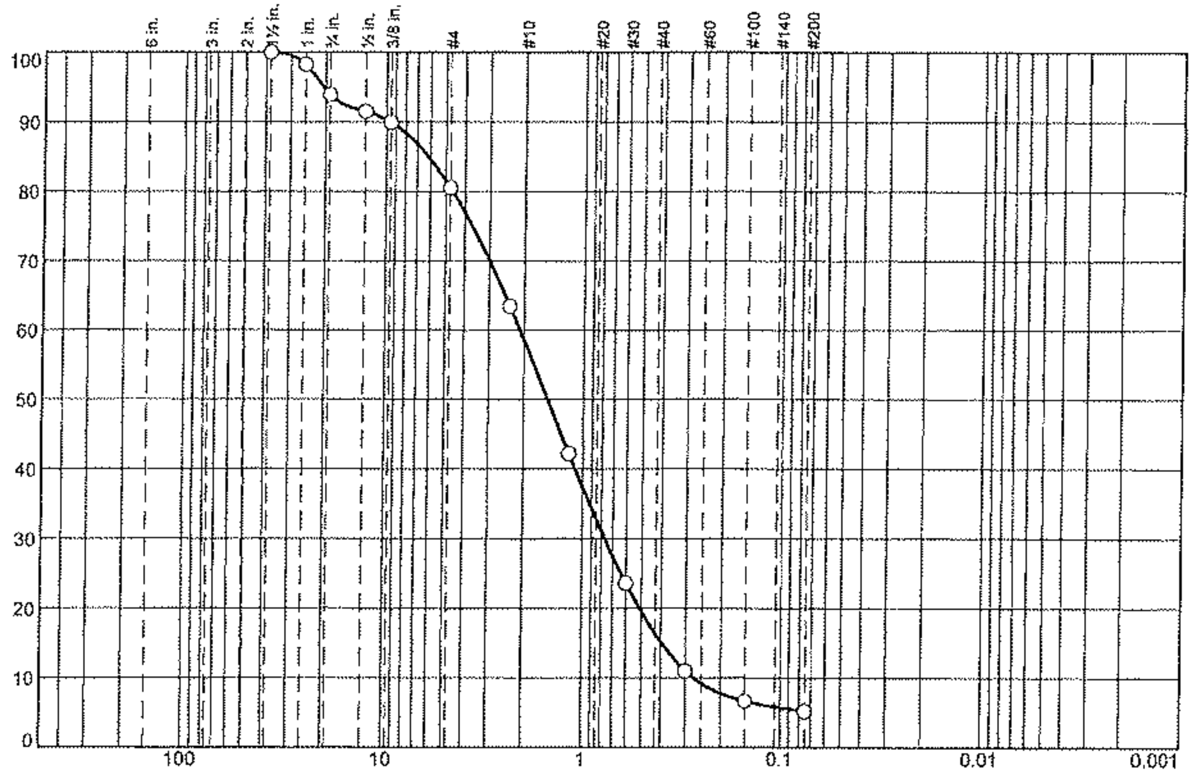
Location: TP-1
Sample Number: S115-136 **Depth:** -2' **Date:** 3/25/15

ALLWEST TESTING & ENGINEERING
Hayden, ID

Client: DCI Engineers
Project: Memorial Field
Project No: 115-073G **Checked By:** CM

Tested By: Kyle Ferguson WAQTC# 22305 **Checked By:** Chris McKissen WAQTC# 20561

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	6	13	22	43	11	5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100		
1"	98		
3/4"	94		
1/2"	91		
3/8"	90		
#4	81		
#8	63		
#16	42		
#30	24		
#50	11		
#100	7		
#200	5.2		

* (no specification provided)

Material Description

well-graded sand with silt and gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 9.5997 D_{85}= 6.1597 D_{60}= 2.0977
D_{50}= 1.5161 D_{30}= 0.7710 D_{15}= 0.3950
D_{10}= 0.2729 C_u= 7.69 C_c= 1.04

Classification

USCS= SW-SM AASHTO= A-1-b

Remarks

Sampled By: S. Brady
Sample Date: 3/19/15
Moisture Content: 5.5%

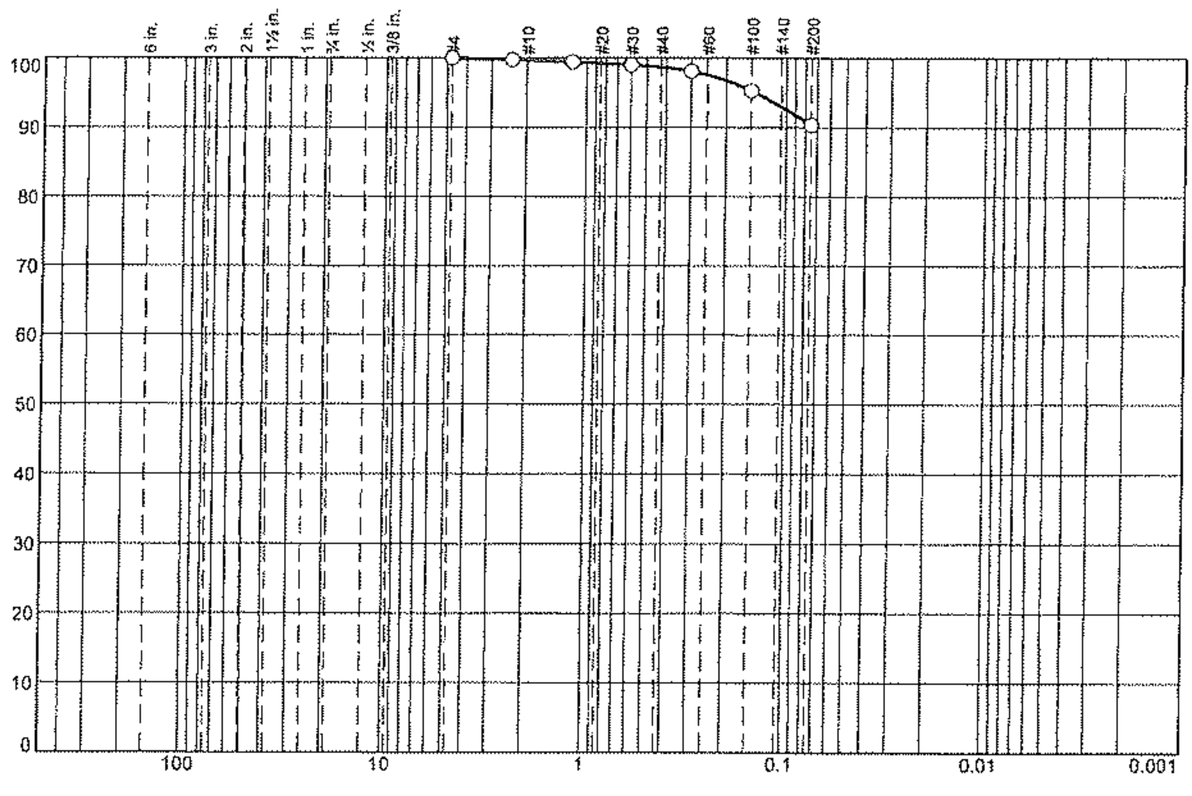
Location: TP-2
Sample Number: S115-137 Depth: -1' Date: 3/25/15

ALLWEST TESTING & ENGINEERING
Hayden, ID

Client: DCI Engineers
Project: Memorial Field
Project No: 115-073G Checked By: [signature]

Tested By: Kyle Ferguson WAQTC# 22305 Checked By: Chirs McKissen WAQTC# 20561

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	9	90	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#8	100		
#16	99		
#30	99		
#50	98		
#100	95		
#200	90		

* (no specification provided)

Material Description

lean clay

Atterberg Limits

PL= 21 LL= 34 PI= 13

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(12)

Remarks

Sampled By: S. Brady
Sample Date: 3/19/15
Moisture Content: 23.2%

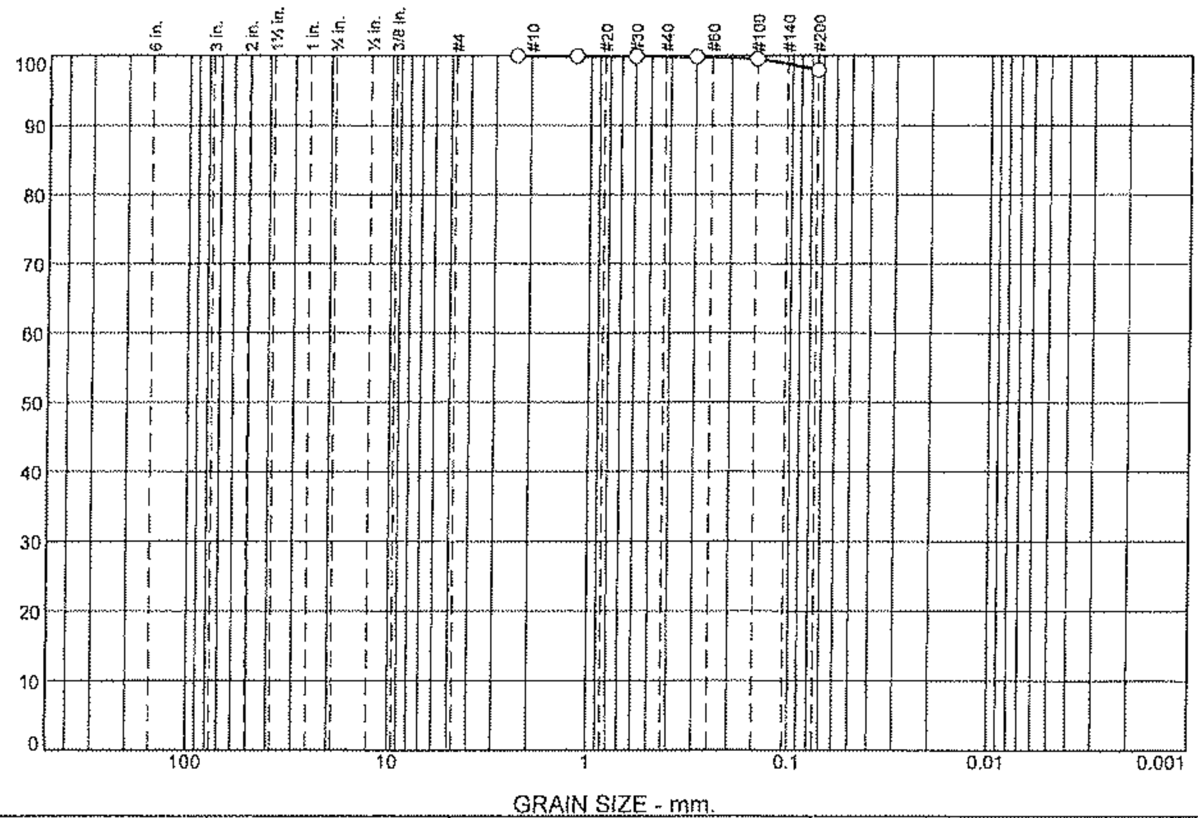
Location: TP-3
Sample Number: S115-138 Depth: -3' Date: 3/25/15

ALLWEST TESTING & ENGINEERING Hayden, ID

Client: DCI Engineers
Project: Memorial Field
Project No: 115-073G Checked By: [signature]

Tested By: Kyle Ferguson WAQTC# 22305 Checked By: Chris McKissen WAQTC# 20561

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	2	98	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#8	100		
#16	100		
#30	100		
#50	100		
#100	99		
#200	98		

* (no specification provided)

Material Description

silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

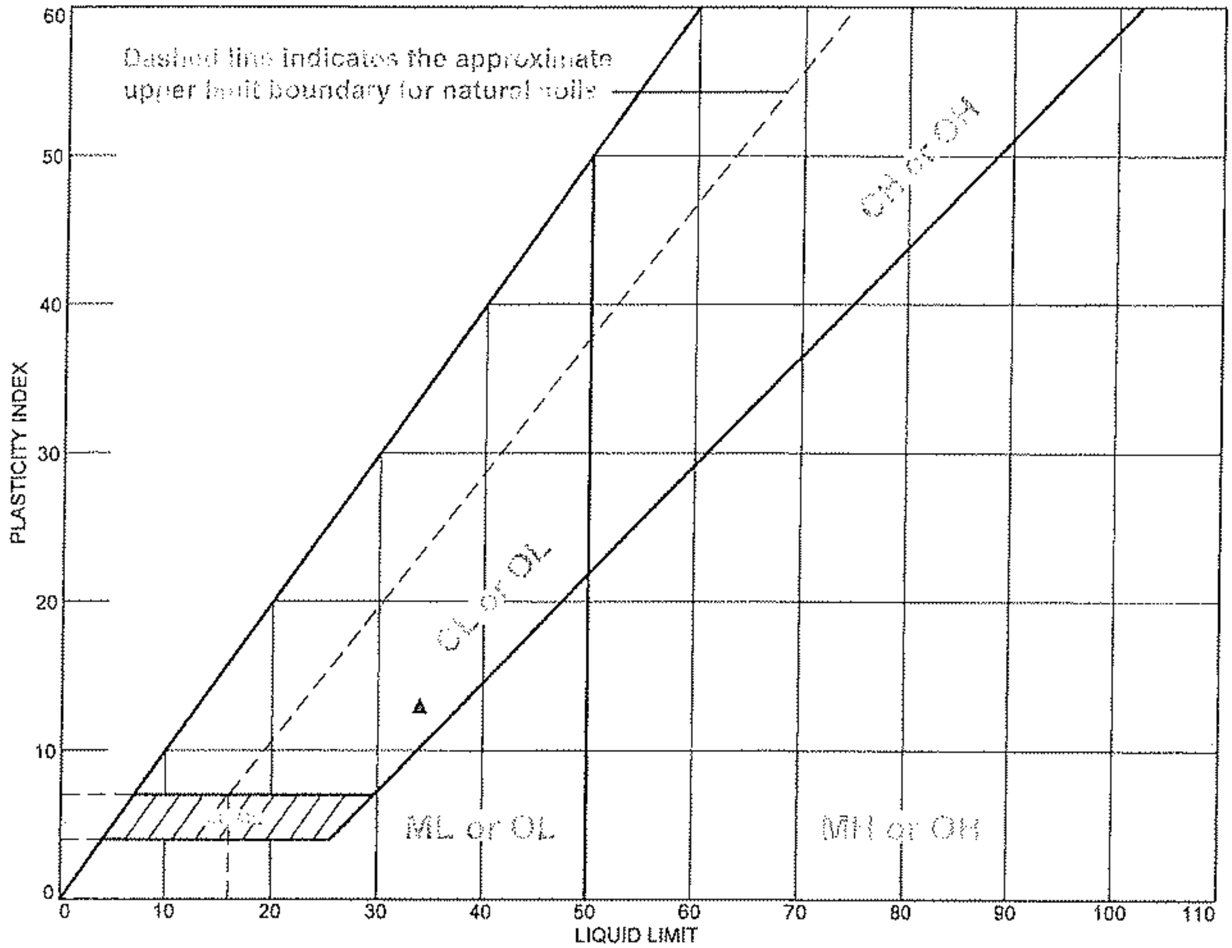
Sampled By: S. Brady
Sample Date: 3/19/15
Moisture Content: 27.5%

Location: TP-6
Sample Number: S115-139 **Depth:** -5' **Date:** 3/25/15

ALLWEST TESTING & ENGINEERING Hayden, ID	Client: DCI Engineers Project: Memorial Field Project No: 115-073G Checked By: *[signature]*

Tested By: Kyle Ferguson WAQTC# 22305 **Checked By:** Chris McKissen WAQTC# 20561

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	silt with sand	NV	NP	NP	93	84	ML
■	well-graded sand with silt and gravel	NV	NP	NP	16	5.2	SW-SM
▲	lean clay	34	21	13	99	90	CL
◆	silt	NV	NP	NP	100	98	ML

Project No. 115-073G **Client:** DCI Engineers

Project: Memorial Field

● **Location:** TP-1 **Depth:** -2' **Sample Number:** S115-136
■ **Location:** TP-2 **Depth:** -1' **Sample Number:** S115-137
▲ **Location:** TP-3 **Depth:** -3' **Sample Number:** S115-138
◆ **Location:** TP-6 **Depth:** -5' **Sample Number:** S115-139

Remarks:
● Sampled By: S. Brady
Sample Date: 3/19/15
■ Sampled By: S. Brady
Sample Date: 3/19/15
▲ Sampled By: S. Brady
Sample Date: 3/19/15
◆ Sampled By: S. Brady
Sample Date: 3/19/15

ALLWEST TESTING & ENGINEERING

Hayden, ID

Checked By: CM

Tested By: Kyle Ferguson WAQTC# 22305 **Checked By:** Chris McKissen WAQTC# 20561

GEOTECHNICAL EVALUATION
MEMORIAL FIELD GRANDSTANDS
ONTARIO STREET
SANDPOINT, IDAHO
ALLWEST PROJECT NO. 114-059G

PROFESSIONAL ENGINEER
LICENSED
14616
6/5/14
STATE OF IDAHO
COLIN J. MEEHAN

June 5, 2014

ALLWEST
Testing & Engineering

WWW.ALLWESTTESTING.COM

Construction Materials Testing
Geotechnical Engineering
Environmental Consulting

June 5, 2014

Mr. Jeff Jensen, P.E.
James A. Sewell & Associates, LLC
1319 N. Division Avenue
Sandpoint, Idaho 83864

RE: Geotechnical Evaluation
Memorial Field Grandstands
Ontario Street
Sandpoint, Idaho
ALLWEST Project No.: 114-059G

Dear Mr. Jensen,

ALLWEST Testing & Engineering, LLC has completed the authorized geotechnical evaluation for Memorial Field Grandstands project in Sandpoint, Bonner County, Idaho. The purpose of this evaluation was to characterize the soil and geologic conditions for the proposed construction. The attached report presents the results of the field evaluation and our recommendations to assist with design and construction of the proposed project.

We appreciate the opportunity to work with you on this project. If you have any questions or need additional information, please do not hesitate to call us at (208) 762-4721.

Sincerely,

ALLWEST Testing & Engineering, LLC

Colin Meehan, P.E.
Hayden Area Manager

Shawn Turpin, P.E.
Lewiston Area Manager

TABLE OF CONTENTS

ALLWEST Project No. 114-059G
Memorial Field Grandstands
Ontario Street
Sandpoint, Idaho

Page

1.0 SCOPE OF SERVICES 1
2.0 PROJECT DESCRIPTION 2
3.0 EVALUATION PROCEDURES 2
4.0 SITE CONDITIONS 2
4.1 General Geologic Conditions 2
4.2 General Soil Conditions 2
4.3 Hydrogeologic Conditions 3
5.0 SUBSURFACE CONDITIONS 3
5.1 Subsurface Soil Conditions 3
5.2 Groundwater Conditions 4
6.0 LABORATORY TESTING 4
7.0 CONCLUSIONS AND RECOMMENDATIONS 4
7.1 Planning Considerations 4
7.2 Site Preparation 5
7.3 Subgrade Stabilization 5
7.4 Excavation 7
7.5 Materials 7
7.6 Fill Placement and Compaction 7
7.7 Wet Weather Construction 8
7.8 Cold Weather Construction 8
7.9 Foundation Recommendations 8
7.10 Seismicity 10
8.0 ADDITIONAL RECOMMENDED SERVICES 10
9.0 EVALUATION LIMITATIONS 11

Appendix A – Vicinity Map, Test Pit Location Map
Appendix B – Test Pit Logs, Unified Soil Classification System
Appendix C – Laboratory Test Results

GEOTECHNICAL EVALUATION
MEMORIAL FIELD GRANDSTANDS
ONTARIO STREET
SANDPOINT, IDAHO

ALLWEST Testing & Engineering, LLC (ALLWEST) has completed the authorized geotechnical evaluation for the proposed Memorial Field Grandstands located on Ontario Street in Sandpoint, Idaho. The general location of the project is shown on the Vicinity Map, Figure A-1, in Appendix A of this report. The purpose of the evaluation was to assess the subsurface soil conditions on the site with respect to the proposed grandstands. This report details the results of the field evaluation and laboratory testing and presents our recommendations to assist the design and construction of the proposed development.

1.0 SCOPE OF SERVICES

To complete the geotechnical evaluation we accomplished the following scope of services:

1) Reviewed the USDA Natural Resources Conservation Service (Soil Conservation Service) and Idaho Geological Survey geologic mapping information for the project site area.

2) Completed a site reconnaissance by walking the property and observing exposed surface conditions including soil, vegetation, erosion and surface drainage.

3) Performed a field evaluation by excavating two (2) exploratory test pits in the area of the proposed grandstands. Obtained bulk samples of the soils encountered in the test pits. The soils were described and classified and the soil profiles were logged.

4) Performed laboratory tests on select soil samples to assess some of the soil engineering characteristics.

5) Reviewed the results of the field evaluation and laboratory testing with respect to the proposed project.

6) Performed engineering analyses and prepared recommendations to assist project planning, design and construction.

7) Prepared this report.

Our services were provided in general accordance with our proposal dated January 14, 2014.

2.0 PROJECT DESCRIPTION

We understand the proposed grandstands will be constructed in the same location as the existing stands and will be supported on spread footings. Preliminary building and grading plans were not available at the time this report was prepared. However, we anticipate the grandstands will be two to three stories in height supported on concrete spread footings. Asphalt or concrete sidewalks, landscaping and storm water management areas will occupy the remainder of the site. We anticipate cut and fill at the site will be less than five (5) feet. A preliminary foundation plan diagram was provided by James A. Sewell & Associates. We understand continuous footing loads up to approximately seven (7) kips per linear foot and column loads of up to approximately 190 kips are estimated. If the proposed project varies from our assumptions, we should be notified to review our recommendations.

3.0 EVALUATION PROCEDURES

To complete this evaluation, we reviewed soil and geologic literature for the project area. We conducted a field evaluation of the property including a site reconnaissance to assist in planning the field evaluation and provide a general overview of the project site. Information obtained from the field evaluation, review of the referenced documents, laboratory testing and geotechnical analysis were utilized to develop recommendations for the geotechnical aspects of the project.

4.0 SITE CONDITIONS

The project site is located in the northeast ¼ of the northwest ¼ of Section 27, Township 57 North, Range 2 West of the Boise Meridian. The site is located south of the intersection of S. Florence Avenue and Ontario Street in Sandpoint, Idaho. The topography of the property is generally level and is a combination of paved sidewalks and grassed landscaped grounds with mature trees to the west.

4.1 General Geologic Conditions

The geologic conditions on the property were mapped on the Preliminary Geologic Map of the Sandpoint 30 x 60 Minute Quadrangle, Idaho and Montana, and the Idaho Part of the Chewelah 30 x 60 Minute Quadrangle by Lewis, et al, 2002. The mapping indicates the geology consists of alluvial deposits. The deposit consists of stream deposits in modern drainages. Most deposits are composed of stratified, poorly sorted, and laterally discontinuous beds of sandy gravel with sand and silt lenses.

The natural soils observed in the test pits were generally consistent with the mapped soil conditions and consisted primarily of silty sand and silt underlying topsoil.

4.2 General Soil Conditions

The USDA Natural Resources Conservation Service (NRCS) has mapped the soil on the property as Mission silt loam. The Mission silt loam is described as volcanic ash and loess over silty glaciolacustrine deposits. The soil profile is described as silt, silty clay and very fine sandy loam. The permeability is slow and run-off is slow. A seasonal high water table is reported at a depth of 12 inches from February through May.

The soil conditions encountered in the test pits was generally consistent with the mapped soil conditions.

4.3 Hydrogeologic Conditions

Perched groundwater was observed in both test pits at the time of the field evaluation. The perched groundwater was observed at approximately three (3) feet below ground surface (bgs). Changes in precipitation, irrigation, construction or other factors may impact depth to groundwater and the surface water flow on the property. Well logs in the area report a static water depth of 15 feet below ground surface.

5.0 SUBSURFACE CONDITIONS

A total of two (2) test pits were excavated at the project site on March 26, 2014. The approximate locations of the test pits are shown on Figure A-2, Test Pit Location Map in Appendix A of this report. The test pits were excavated with a John Deere 485 backhoe with a standard soil excavation bucket owned and operated by the City of Sandpoint Parks Department. The soil conditions encountered in the test pits were visually described and classified in general accordance with ASTM D2487 and D2488 and the subsurface profiles were logged. The test pits were loosely backfilled at the conclusion of the field evaluation. The backfill will consolidate with time. We recommend the backfill be re-excavated and the material replaced and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D1557 (modified Proctor) prior to construction.

Detailed descriptions of the soil observed in the test pits are presented on the Test Pit Logs in Appendix B of this report. The descriptive soil terms used on the test pit logs and in this report can be referenced by the Unified Soil Classification System (USCS). A copy of the USCS is included in Appendix B. The subsurface conditions may vary between test pit locations. Such changes in conditions would not be apparent until construction. **If the subsurface conditions do change from those observed in the test pits, the construction timing, plans and costs may change.**

5.1 Subsurface Soil Conditions

The soil conditions encountered in the test pits consisted of the following:

<u>Topsoil</u> – The topsoil consisted of silty sand with gravel. The topsoil appeared loose, dark brown and wet. Organics and roots were observed throughout.

<u>Silty sand</u> – The silty sand appeared loose, orange-brown and wet. Roots were observed throughout.

Silt – The silt appeared firm, gray-tan and moist to wet.

5.2 Groundwater Conditions

Perched groundwater was observed in both test pits at approximately three (3) feet below ground surface (bgs). The elevation and presence of the water table may vary with seasonal changes in precipitation, infiltration, irrigation and many other factors.

6.0 LABORATORY TESTING

Laboratory testing was performed to supplement field classifications and to assess some of the soil engineering parameters. The laboratory testing included gradation (ASTM D422 and ASTM D1140), Atterberg Limits (ASTM D4318) and density of soil in-place (ASTM D2937). The laboratory test results are in Appendix C of this report. The laboratory testing was performed by ALLWEST.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The following recommendations are presented to assist the planning and design of the proposed grandstands and related site work. The recommendations are based on our understanding of the proposed grandstands, the conditions observed in the test pits, laboratory test results and geotechnical analysis. **If the scope of the construction changes, or if conditions are encountered during construction that are different than those described in this report, we should be notified so we can review our recommendations and provide revisions if necessary**.

7.1 Planning Considerations

The soil underlying the project site is fine grained and soft and was relatively consistent across the property. Due to the perched groundwater, the on-site soil may be susceptible to caving and sloughing. The soils may also be susceptible to liquefaction during a severe seismic event and consideration should be given to completing a liquefaction hazard assessment for the site. We anticipate the sides of deeper excavations such as utility trenches will be unstable due to the soft/loose and wet subsurface conditions. The site will not be suitable for storm water infiltration or drywells due to the low permeability of the native soil. It will be important in grading plans to provide positive drainage away from structures and pavement areas.

Several issues related to the fine-grained soils are present at the site may impact construction. The fine-grained soils will become very soft when saturated. When saturated and exposed to freezing temperatures, the fine-grained soils may also be susceptible to frost heave. Achieving compaction with the on-site soils is likely to be difficult. Based on the measured in-place moisture content and our experience in the area, the on-site soils are well over the optimum moisture content for compaction and will require drying prior to use as fill.

Trafficking the site with rubber-tire equipment will likely result in rutting and/or pumping of the subgrade. This disturbance, should it occur, will result in the need for over-excavation and replacement of the disturbed soils with structural fill. Track-mounted equipment should be utilized to traffic the site. Excavation of the soils should be conducted with excavators equipped with smooth edged buckets to reduce the potential for disturbance to the subgrade. Due to the high in-situ moisture contents, subgrade stabilization of the subgrade may be required to provide a suitable surface for fill placement and compaction. Consideration should be given to construction of a construction traffic road outside of building and pavement areas to reduce the potential for disturbance of the subgrade.

7.2 Site Preparation

Topsoil was encountered in both test pits ranging from approximately ½ to one (1) foot below existing grade. We recommend topsoil and organics be excavated and removed from the proposed structural areas. The location and thickness of topsoil and organics is expected to vary depending across the site.

Subsequent to grubbing and removal of topsoil, deleterious and loose/disturbed materials, we recommend the exposed subgrade should be proof-rolled to a firm, non-yielding surface. If the subgrade is observed to significantly deflect it should be over-excavated to firm, non-yielding soil and replaced with properly compacted fill or stabilized as recommended in the subgrade stabilization section of this report.

We recommend the prepared subgrade be evaluated at the time of construction by a geotechnical engineer.

7.3 Subgrade Stabilization

If the subgrade is observed to pump or deflect significantly during proof rolling, it should be stabilized prior to placement of fill and concrete. The subgrade may be stabilized using either crushed, angular cobble or with geosynthetic reinforcement in conjunction with imported structural fill. The required thicknesses of crushed cobble or structural fill (used in conjunction with geosynthetic reinforcement) will be dependent on the construction traffic loading which is unknown at this time. Revisions to the stabilization method may be necessary depending on the anticipated construction traffic.

If crushed, angular cobble is selected to stabilize the subgrade it should have a maximum particle size of six (6) inches and should be relatively free of sand and fines (silt and clay). The first layer of cobble should be placed in a 12-inch thick loose lift and trafficked with tracked-construction equipment until it is observed to stabilize. The cobble should then be vibrated with a large smooth drum vibratory compactor. If the cobble is placed in a confined excavation, it should be mechanically stabilized from outside the excavation with vibratory compaction equipment. Vibratory compaction should be discontinued if it reduces the subgrade stability.

If geosynthetic reinforcement is selected, it should consist of Tensar TX-160 or equivalent. Alternatives to Tensar TX-160 should be approved by the geotechnical engineer prior to use on site. The following recommendations are provided for subgrade stabilization using geosynthetic reinforcement.

- Geosynthetic reinforcement materials should be placed on a properly prepared subgrade with smooth surface. Loose and disturbed soil should be removed prior to placement of geosynthetic reinforcement materials.

- A 4-ounce, non-woven filter fabric should be placed on the properly prepared subgrade. The geosynthetic reinforcement should be placed directly on top of the filter fabric. The filter fabric and geosynthetic reinforcement should be unrolled in the primary direction of fill placement and should be over-lapped at least three (3) feet.

- The geosynthetic materials should be pulled taut to remove slack and pinned in place. If the material does not remain taut during fill placement its effectiveness will be reduced.

- Construction equipment should not be operated directly on the geosynthetic materials. Fill should be placed from outside the excavation to create a pad to operate equipment on. We recommend a minimum of 12 inches of structural fill be placed over the geosynthetic reinforcement before operating construction equipment on it. Low pressure, track-mounted equipment should be used to place fill over the geosynthetic reinforcement.

- Fill placed directly over the geosynthetic reinforcement should be properly moisture conditioned prior to placement and should meet the following gradation:

Sieve Size	% Passing
1 ½ inch	100
¾ inch	50 - 100
#4	25 - 50
#40	10 - 20
#100	5 - 15
#200	less than 10

- The fill material should be properly compacted. Care should be taken with the use of vibratory compaction equipment. Vibration should be discontinued if it reduces the subgrade stability.

An ALLWEST representative should be on-site during subgrade stabilization activities to verify our recommendations are followed and to provide additional recommendations as appropriate.

7.4 Excavation

Excavation of the on-site soil should be conducted with smooth edged buckets to reduce the potential for disturbance to the subgrade. We recommend excavations greater than four (4) feet deep be sloped no steeper than 1.5:1 (horizontal to vertical). Alternatively, deeper excavations may be shored or braced in accordance with Occupational Safety and Health Administration (OSHA) specifications and local codes. Regarding trench wall support, the site soil is considered Type C soil according to OSHA guidelines. The contractor is responsible to provide appropriate trench wall support and/or sloping.

7.5 Materials

The on-site soils (silt) are not suitable for re-use as structural fill. Consideration may be given to using the on-site silt and silty sand as site grading fill and utility trench backfill provided it is properly moisture conditioned (dried) prior to placement and free of organics and deleterious materials. It should be noted that the silt will be difficult to compact in utility trenches.

Import materials should be granular soil free of organics, debris and other deleterious material and meet the following recommendations. Import materials should be approved by the Geotechnical Engineer prior to delivery to the site.

Fill Type	Recommendations
Structural Fill	Maximum size ≤ 3 inches; Passing No. 200 Sieve ≤ 15%; Non-plastic
Site Grading	Maximum size ≤ 3 inches; Passing No. 200 Sieve ≤ 35%; Liquid Limit ≤ 35%
Utility Trench Backfill	Maximum size ≤ 2 inches; Passing No. 200 Sieve ≤ 15%; Non-plastic

7.6 Fill Placement and Compaction

Fill should be placed in lift thicknesses which are appropriate for the compaction equipment used. Typically, eight (8) inch loose lifts are appropriate for typical rubber tire and steel drum compaction equipment. Lift thicknesses should be reduced to four (4) inches for hand operated compaction equipment. Fill should be moisture conditioned to within two (2) percentage points of the optimum moisture content prior to placement to facilitate compaction. In wet weather or spring conditions, using silty or fine-grained soil for fill may delay construction and increase costs.

Fill should be compacted to 95 percent of the maximum dry density as determined by modified Proctor.

7.7 Wet Weather Construction

Due to the climatic effects in this region during late fall, winter and spring (generally wet conditions), we recommend construction (especially site grading) take place during the summer and early fall season, if possible. If construction occurs during or immediately after excessive precipitation, it may be necessary to over-excavate and replace saturated subgrade soil which might otherwise be suitable. We recommend the contractor have means and equipment available for altering surface water collection and dewatering open excavations.

The fine-grained soils encountered at the site are sensitive to disturbance. We recommend construction traffic is minimized where these soils are exposed. Low ground pressure (tracked) equipment should be used to minimize disturbance. Soft and disturbed subgrade areas should be excavated to undisturbed soil and backfilled with structural fill. Compaction of the fill should be sufficient to preclude pumping of the native soil.

In addition, it should be noted the fine-grained soil tends to have notable adhesion when wet and may be easily transported off-site by construction traffic which could create on-site and off-site erosion issues.

7.8 Cold Weather Construction

The native soils encountered in the test pits are considered to be frost susceptible. If site grading and construction are anticipated during cold weather, we recommend good winter construction practices be observed. Snow and ice should be removed from excavated and fill areas prior to additional earthwork or construction. Footings, floors slabs or any structural portions of the construction should not be placed on frozen ground; nor should the supporting soils for buildings be permitted to freeze during or after construction. Frozen soils should not be used as backfill or fill.

7.9 Foundation Recommendations

Shallow Foundations

The proposed Memorial Field Grandstands may be supported on conventional spread footings. The following recommendations are provided for foundations based on the subsurface conditions observed and the stated assumptions:

- Footings should bear on a minimum of 24 inches of properly placed imported structural fill. The structural fill should extend horizontally at least 24 inches beyond the perimeters of foundations.

- Footings bearing on structural fill may be designed based on a maximum allowable bearing pressure provided in the table below.

CONTINUOUS FOOTING		SQUARE FOOTING	
Footing Width (ft)	**Bearing Capacity (psf)**	**Footing Width (ft)**	**Bearing Capacity (psf)**
2	1,500	5	1,300
3	1,650	7	1,800
4	1,800	9	2,400

- A coefficient of friction of 0.40 may be used for sliding resistance between concrete footings and structural fill.

- Continuous footings should be a minimum of 18 inches in width and column footings should be a minimum of 24 inches in width.

- The maximum allowable bearing pressure value may be increased up to 30 percent to account for transient loads such as wind and seismic.

- Foundation bearing surfaces should be free of loose soil and debris.

- If the previous recommendations are implemented, it is our opinion a total settlement due to foundation loads will be less than one (1) inch and differential settlement from foundation loads will be less than approximately ½ of an inch.

- Exterior footings should be embedded at least 36 inches below finished exterior ground surface to protect against frost action.

- We recommend backfill placed on the exterior sides of the foundation walls be compacted to a minimum of 95 percent of the modified Proctor maximum dry density. Beneath slabs, steps, and pavements, the backfill should be compacted to a minimum of 95 percent of the modified Proctor maximum dry density. Backfill should be brought up uniformly on both sides of the foundation walls to reduce displacement of the foundation walls.

The proposed grandstands may be supported on conventional spread footings supported on Rammed Aggregate Piers (RAP), also referred to as Geopiers®, which extend a depth determined by Geopier. Additional subsurface exploration, laboratory testing and engineering analysis will be necessary to develop recommendations for RAP.

<u>Deep Foundations</u>
As an alternative to shallow foundations supported on RAP or structural fill, deep foundations such as auger-cast piles or driven piles may be considered for support of the proposed structure. Deep foundation recommendations were not included in our

scope of services. Additional subsurface exploration, laboratory testing and engineering analysis will be necessary to develop recommendations for deep foundations.

7.10 Seismicity

We anticipate the 2012 International Building Code (IBC) will be used as the basis for design of the proposed structures. Based on information provided in the referenced geophysical report, the soil at the site can be characterized as Site Class E for seismic design.

The following seismic parameters were calculated using Earthquake Ground Motion Parameters software, version 5.0.6 (USGS, June 29, 2006) for use with the 2012 IBC. The latitude and longitude for the site were used to specify the location of the subject property. The following Site Class E seismic parameters may be used for design.

Latitude (degrees)	Longitude (degrees)	Spectral Accelerations		Site Coefficients	
		S_s	S_1	F_a	F_v
48.265139	- 116.559861	0.343g	0.113g	2.202	3.462

8.0 ADDITIONAL RECOMMENDED SERVICES

We recommend ALLWEST Testing & Engineering, LLC be retained to provide construction materials testing and observation to verify the soil and geologic conditions and the report recommendations are incorporated into the actual construction. As a minimum we recommend the following testing and observations be provided by ALLWEST:

- Observe grubbing and removal of unsuitable soils prior to site grading.
- Observe and test compaction of the subgrade below foundations prior to placement of concrete.
- Conduct soil infiltration testing for storm water disposal areas.
- Provide special inspections as required by the IBC and structural engineer.

If we are not retained to provide the recommended construction observation and testing services, we cannot be responsible for soil engineering related construction errors or omissions.

9.0 EVALUATION LIMITATIONS

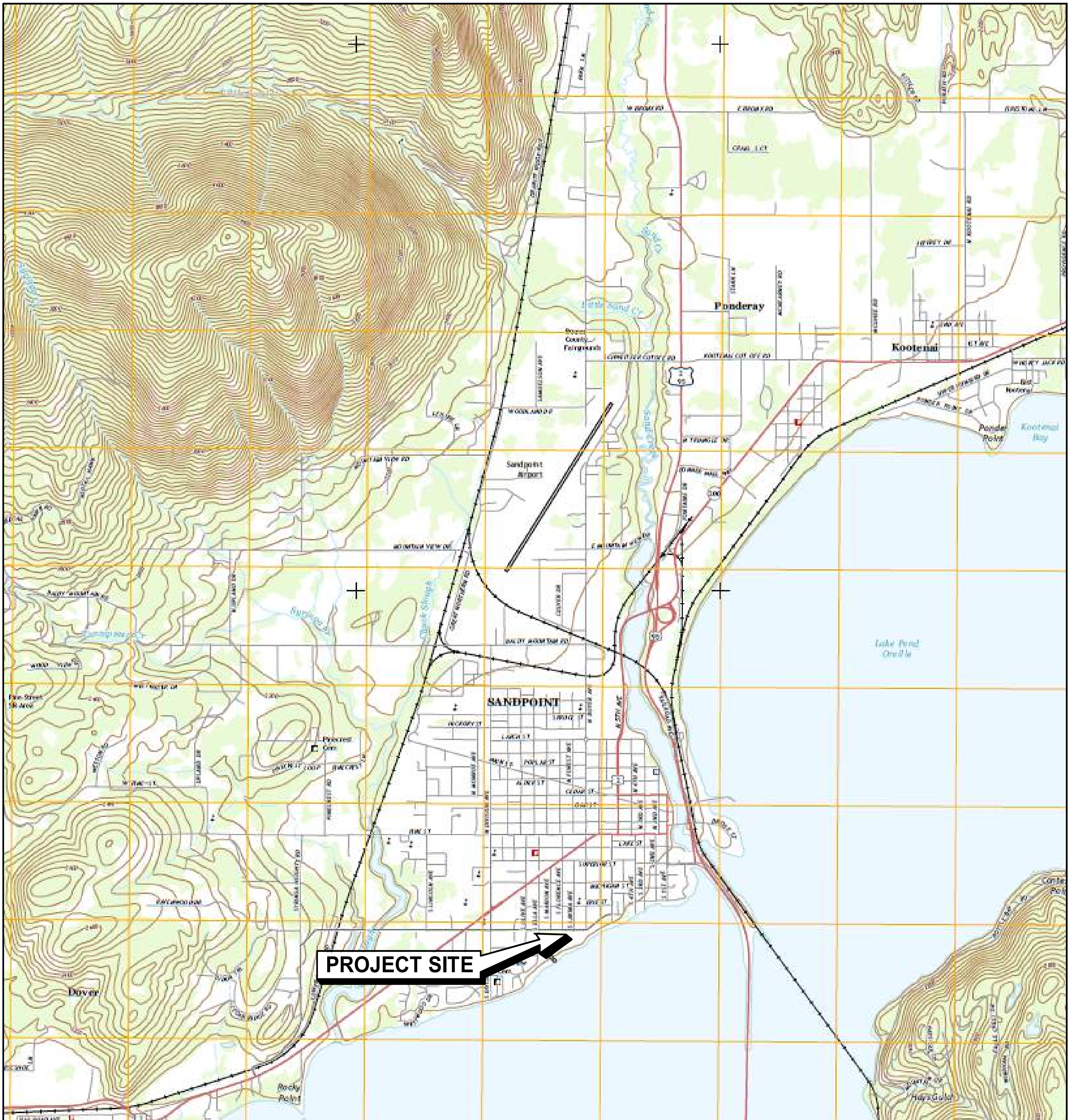
This report has been prepared to assist the planning and design of the proposed Memorial Field Grandstands in Sandpoint, Idaho. Reliance by any other party is prohibited without the written authorization of ALLWEST. Our services consist of professional opinions and conclusions made in accordance with generally accepted geotechnical engineering principles and practices. This acknowledgement is in lieu of all warranties either expressed or implied.

The following plates complete this report:

Appendix A – Vicinity Map, Test Pit Location Map
Appendix B – Test Pit Logs, Unified Soil Classification System
Appendix C – Laboratory Test Results

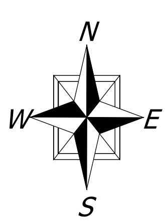
Appendix A

Vicinity Map
Test Pit Location Map



USGS 7.5 MINUTE SERIES TOPOGRAPHIC MAP
SANDPOINT, QUADRANGLE, IDAHO
2013

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES



ALLWEST Testing & Engineering

Hayden, Idaho

www.allwesttesting.com

FIGURE A-1: VICINITY MAP

Memorial Field Grandstands

Ontario Street

Sandpoint, Idaho

Client Name: James A. Sewell & Associates, LLC

Project No.: 114-059G

Date:: June 5, 2014

REFERENCE: USGS

TEST PIT LOCATIONS ARE APPROXIMATE

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

N W E S	ALLWEST Testing & Engineering	**FIGURE A-2: TEST PIT LOCATION MAP**
		Memorial Field Grandstands
		Ontario Street
		Sandpoint, Idaho
	Hayden, Idaho	Client Name: James A. Sewell & Associates, LLC
	www.allwesttesting.com	Project No.: 114-059G
		Date:: June 5, 2014

Appendix B

Test Pit Logs
Unified Soil Classification System

LOG OF TEST PIT

PROJECT:	Geotechnical Evaluation Memorial Field Grandstands 801 Ontario Street Sandpoint, Idaho James A. Sewell & Associates, LLC

TEST PIT: **TP-1**

LOCATION: **See Appendix A Figure A-2: Test Pit Location Map**

DATE: **3/26/2014** SCALE: **1" = 1.5'**

Depth 0.0	ASTM D2487 Symbol	Description of Materials	WL	Tests or Notes
0.5		TOPSOIL; silty sand with gravel; appeared loose, dark brown, moist. Organics and roots observed throughout.		
1	SM	Silty SAND; appeared loose, orange-brown, moist. Roots observed throughout.		
8	ML	SILT; appeared stiff, gray-tan, moist to wet . Roots observed to 3 feet.		Seeps on sidewalls at approximately 3 feet. Bulk sample obtained. Bulk sample obtained. 100% passing #200 sieve LL: 32; PL: 27; PI: 5 In-place dry density: 87 pcf In-place moisture content: 31%
		Bottom of test pit TP-1 at approximately 8 feet below ground surface.		

(See Report and Standard Plates for elevation and descriptive terminology.)

LOG OF TEST PIT

PROJECT: **Geotechnical Evaluation Memorial Field Grandstands 801 Ontario Street Sandpoint, Idaho James A. Sewell & Associates, LLC**	TEST PIT: **TP-2** LOCATION: **See Appendix A Figure A-2: Test Pit Location Map** DATE: **3/26/2014** SCALE: **1" = 1.5'**

Depth 0.0	ASTM D2487 Symbol	Description of Materials	WL	Tests or Notes
1		TOPSOIL; silty sand with gravel; appeared loose, dark brown, moist. Organics and roots observed throughout.		
2	SM	Silty SAND; appeared loose, orange-brown, moist. Roots observed throughout.		
6	ML	SILT; appeared stiff, gray-tan, moist to wet. Roots observed to 3 1/2 feet.		Seeps on sidewalls at approximately 3 feet. Bulk sample obtained.
		Bottom of test pit TP-2 at approximately 6 feet below ground surface.		

(See Report and Standard Plates for elevation and descriptive terminology.)

Unified Soil Classification System

MAJOR DIVISIONS			SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS	GRAVELS	CLEAN GRAVELS	GW	Well-Graded Gravel, Gravel-Sand Mixtures.
			GP	Poorly-Graded Gravel, Gravel-Sand Mixtures.
		GRAVELS WITH FINES	GM	Silty Gravel, Gravel-Sand-Silt Mixtures.
			GC	Clayey Gravel, Gravel-Sand-Clay Mixtures.
	SANDS	CLEAN SANDS	SW	Well-Graded Sand, Gravelly Sand.
			SP	Poorly-Graded Sand, Gravelly Sand.
		SANDS WITH FINES	SM	Silty Sand, Sand-Silt Mixtures.
			SC	Clayey Sand, Sand-Clay Mixtures.
FINE GRAINED SOILS	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50%		ML	Inorganic Silt, Silty or Clayey Fine Sand.
			CL	Inorganic Clay of Low to Medium Plasticity, Sandy or Silty Clay.
			OL	Organic Silt and Clay of Low Plasticity.
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH	Inorganic Silt, Elastic Silt, Micaceous Silt, Fine Sand or Silt.
			CH	Inorganic Clay of High Plasticity, Fat Clay.
			OH	Organic Clay of Medium to High Plasticity.
Highly Organic Soils			PT	Peat, Muck and Other Highly Organic Soils.

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Appendix C

Laboratory Test Results

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LABORATORY SUMMARY

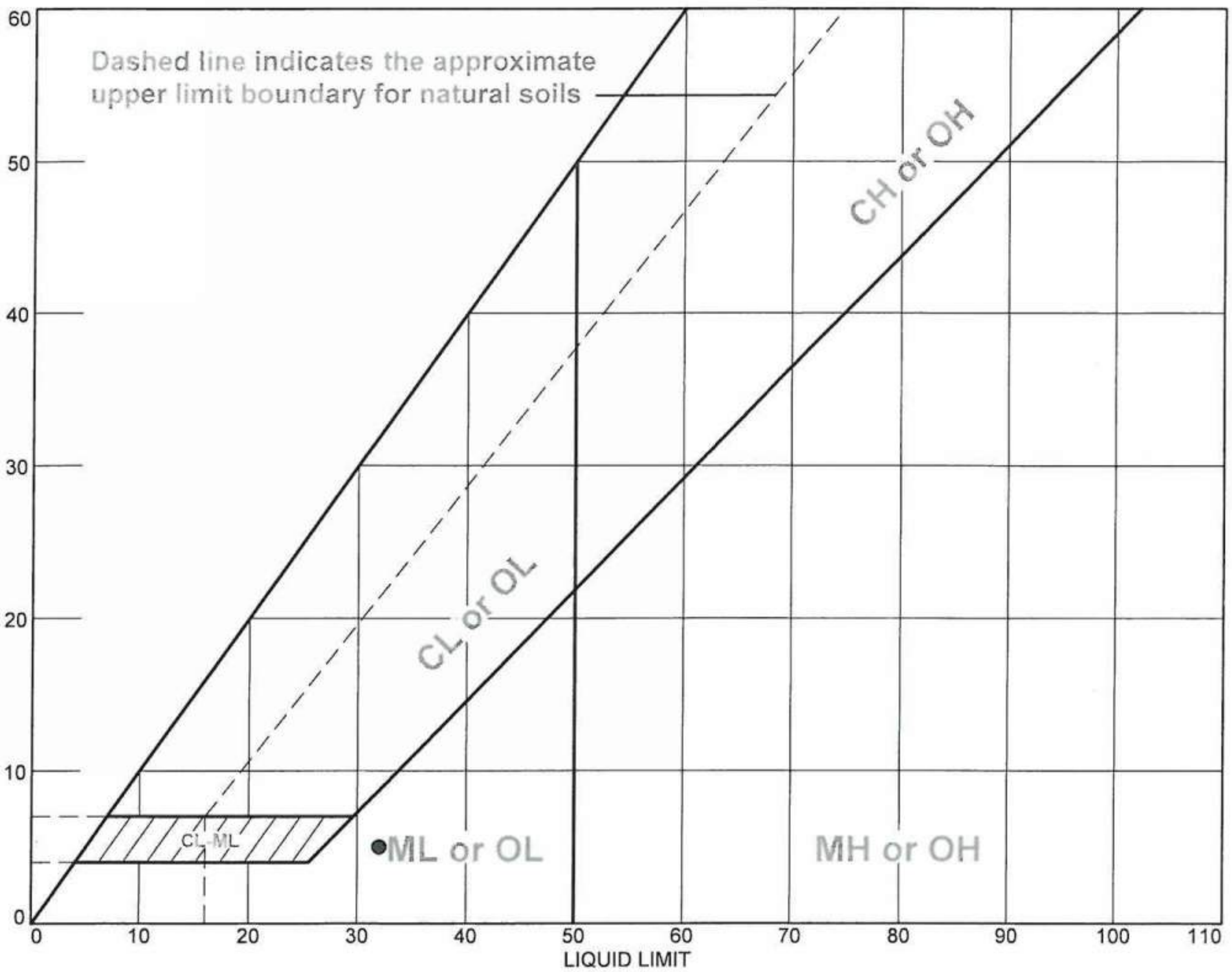
PROJECT NAME:	Memorial Field Stands	**PROJECT NO:**	114-059G
CLIENT NAME:	James A. Sewell	**DATE:**	3/31/2014
LOCATION:	Test Pit 1 @ -7.0'	**SOURCE:**	N/A

SAMPLE NUMBER:		1				
LAB SAMPLE NUMBER:		S114-089				
SAMPLED BY:		S. Brady				
DATE SAMPLED:		3/26/2014				
MATERIAL:		Silt				
SAMPLE LOCATION:		TP-1 @-7.0'				
TEST DESCRIPTION	**SPEC.**	**Results**				
Density of Soil in Place						
by the Drive -Cylinder Method						
(ASTM D 2937)						
In-place dry density, pcf		87.2				
In-place moisture content, %		31.0				
Sieve Analysis						
(ASTM D1140 / AASHTO T248)						
#200 (Percent Passing)		100				
Atterberg Limits						
(ASTM D4318 / AASHTO T89, T90)						
Liquid Limit		32				
Plastic Limit		27				
Plasticity Index		5				

Remarks: **Reviewed By:** for McKissen

Hayden Testing Manager : Chris McKissen
Hayden Engineering Manager: Colin Meehan, P.E.
690 W. Capstone Court • Hayden, ID 83835 • (208) 762-4721 • Fax (208) 762-0942
www.allwesttesting.com

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silt	32	27	5	100	100	ML

Project No. 114-059G **Client:** James A. Sewell

Project: Geotechnical Evaluation

Memorial Field Stands

● **Location:** TP-1 **Depth:** 7' **Sample Number:** S114-089

Remarks:

● Sampled By: S. Brady

Sample Date: 3/26/13

ALLWEST TESTING & ENGINEERING

Hayden, ID

Checked By: CM

Tested By: Kyle Ferguson WAQTC# 22305 **Checked By:** Chris McKissen WAQTC# 20561